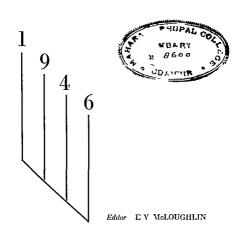
# THE BOOK OF KNOWLEDGE

# ANNUAL



THE GROLIER SOCIETY NEW YORK · TORONTO

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BOOK OF KNOWLEDGE
The Children's Eucyclopedia
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THE BRODE OF NEOWLEDGE ANNUAL 1946

In survey of the most interesting and important events of the year that has passed perhaps the sort of survey you might have made if you could have set on the imnor and in the property of the property o

steeriton more even tight war. Unought is war made to serve the war. The subject of course was Science. Chief actors in the most special ular drains of the year were neutrons positions and electron matter. Description of the properties of the pro

dawned. You have seen hatory a time clock clock forward.

The keynote of this Annual, therefore is Science. There are chapters on basic science and the control of the cont

tire havis of our economic life

Do not be afraid of the word science it
comes from the Latin scire to know science
in its broadest meaning is nothing more nor
less than knowledge.

A wase man once said that the great circle
of knowledge is most useful not at its core

or knowledge is most useful not at its core but at its rim where it touches other knowl edge. So it is with modern science. If you understand any art of it you soon find that it sheds I ght upon another are in the circle. It is the editors hope that The Book or NOWLEGE. ANNUAL 1946 will light for

NOWLEDGE ANNUAL 1946 will light for a boy and girl many an arc in the wide arcle of Science

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# AFRICA

# ..a continental

guestion mark...

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Roy Winthrop Hatch

IN the vast cont nent of Africa there are many Africas with such important differences of peoples and governments that we must speak of them separately

There is North Africa and French West Africa and Egypt and the Sudan There is Eth opia and French Equatorial Africa and British East Africa There is the Belgian Congo and Liberia and British West Africa There is Portuguese West Africa (Angola)

and the Union of South Africa And each one of these Africas has its problems

If your father and mother were asked to choose one word to destre he Africa they, read about when they were in school they would probably use the adjective of the great explorer Henry M Stanley who spoke of darkest Africa Did you ever stop to wonder why Africa was given such a name? Doesn t the sun shine as by gittly there as it does in other lands? To be sure it does But when Stanley sad darkest Afr ca he

meant that great areas particularly in the interior of the continent were absolutely un

known to us
Today new I ght has been thrown on this
dark continent. And many boys in sol
ders uniforms have helped to bring this new
1 ght. They have written home about the
places and the people they have seen They
have told of strange native customs of new
before and the wild an intail of the trope
topic the wild an intail of the trope
topic the weird beauty of a great desert
in the monolight the sweep of broad rives.

Moon
In these letters and in the newspapers
the moving petures and over the rad o we
by a gone with the troops from Casablanca
to Cairo to Cape Town But all these buts of
eccuption that we have preced together may
be a given us a picture of Africa rather 1 ke
a Fessay ouzgle with important parts missing

and the mysterious Mountains of the



Royal Canad an A For photo Jan Christiana, Smuta, prime minister of South Africa.

of Africans Belgium Spain and Portugal look upon their colonies as permanent posses stons. These policies conflict with each other and create many difficulties not only be tween the European powers involved but more directly with the natives

Of the two independent countries in Africa one is a republic and the other is a lingdom Thanks to art travel the Negrorepublic of Liberta no longer seems very faraway Fisherman's Lake in Libera is a base of the Pan American Airways. The bulge of Piranl is nearer to Fisherman's Lake than it is to Dakar on the Aircan bulge One of the important developments in Libera in recent years has been the production of rubber which you may read about in The Story of Rubber in this Annual.

The only other independent country in Africa is Ethiopia the valiant langdom of Haile Selassie In 1935 'Ussolini's sold ers invaded Ethiopa But with England's a dEthiopia drove out the Italians in World War II and Haile Selassie again sits upon the independent throne of his fathers

In other divisions of Africa there are grave problems of race and color These problems are acute in the Union of South Africa. The natives of South Africa and Africa. The natives of South Africa and the propulation but they possess only 8 per cent of the population but they possess only 8 per cent of the land However some of the white leaders of South Africa work of the natives in northern Africa where the Mohammedian religion pre Africa where the Mohammedian religion pre for Viohammedians do not believe in making color or race distinctions

### AFRICAN BOYS AND GIRLS IN SCHOOL ARE BRIGHT AND QUICE TO LEARN

There is plenty of evidence that African children respond as well to any type of schooling as European children do Mission aries and travelers in Africa have stated that the cultural possibilities of the African na tives are undemable. They have found the

African able to profit from a high degree of training and education

The story of the treatment of African

The story of the treatment of African natives by the ruling whites is not a pleasant one No issue calls for more immediate remedy than does the ill treatment of the natives by some of the white overlords or

Vative Africans form a large supply of cheap labor for many African industries such as m ning--in South Africa-and the rul ber industry of the Congo and the equa



Fen h Pe s and Inf na on Se v ce The Sul an of Morecco decorates a native soldier

torial belt Some of the Africas have imposed taxes known as the Head and Hut taxes. The workers have to pay these taxes out of their small wages and this keeps their standard of living very low Unfortunately Europeans have brought tuberculosis and other diseases to Africa. These have taken a terrible toil among the ratives.

However there are leaders, both black and white who see clearly that many of these old problems must find a remedy in the near future. Vany of these leaders are turning to the schools for help Schools are not being formed to teach and train young Africans so that they may be better and more

efficient citizens One of the leaders in this hope for a new Africa is Dr. Ako Adjer. When he was a boy Ako Adjer was a member of the Ga tribe of the Gold Coast He came to the United States as a young man and studied law and journalism at Columbia University Now Dr Adjer is a professor at Fisk a Negro university in Nashville Tennessee He speaks therefore as one who can see both sides of Africa's problems Although Dr Adjer believes that his native land can have a bright future he knows that the Africans themselves must be taught to ach eve it. In None of the plans and his own words pol cies we now formulate for post war Af rica will ever succeed until the Africans themselves are trained to assume responsi bility for their own destiny

# AGRICULTURE and a HEALTHY WORLD

Ry Robert F and Laura T Griggs

FOR the first time in h story it beg is to seem possible that all the peoples of the world will be able to get the right quantity of the right food to make them well and

strong and happy

Down through the ages great masses of people n one part of the world or another have known the dreadful mean ng of starvation. The cry of not enough food not enough food has been and still is uttered by vast populations. The lack of food kills intany and it leaves many more in a weak end cond tion that greatly cuts down the number of years they can espect to live

number of years they can expect to live

Not only is the amount of food important
but likewise the k nd of food. The emphasis
on nutritional content—that is the actual

on nutritional content—that is the actual chem cal value of the food to man so trainer system—can not be made strong enough. The doors of this subject have just been opened in the last few years. We know much more than we used to know about what foods keep people healthy. Agriculture by using this knowledge to produce the correct foods will help the world's bill one small before the world's bill one will be the world's bill one.

In May of 1943 representatives of forty four nations met at Hot Springs August for a Conference on Food and Agriculture New Description and Agriculture New Zeland New Description and New Zeland New Page New Zeland New Description and New Zeland New Page New Zeland New Page New Zeland New Page New P

Of the less well fed peoples of the earth the Hot Springs report drew a picture of present needs and desirable changes China s delegate reported. It is a conservative estimate to say that half of China never has enough to eat. Stark famine is not uncommon and in North China is a regular occurrence

In Ind a op per cent of the farm families have poor health due largely to malurit ton tack of noun-himent) and most of the people of India are farmers. In these two great countries of three fourths of a billion inhabitants the average length of life is only about thirty say years. In the best nounried countries with a Demark and New Yea land the average person lives nearly twice as long it only seen years.

In the Philippines under the United from the disease of beriber a disease of the foot nerves even though we know the cure. The natures eat almost no vegetables and fru ts. Of the r babies only half as many live.



as in America. In the countries bordering the Mediterranean severe poverty and mal nutrition are the rule.

Careful studies in Britain and the United States have proved that where there is pow erty the people are undermourished. When the incomes of the people go up as they have done during the war, the poor buy more protective foods, such as milk, meat, etc. One of the chief causes of food shortages during the wair was the wider spread of prosperity among the people allow people could afford the proper such as the such as the proper such as the true in pace with the demand pippy and not true up note with the demand proper such as the

As an effort toward solving the problems of agriculture and food supply in the world, the United Nations Food and Agriculture Organization held its first meeting at Quebec in October Thirty seven countries were represented Here a groundwork was laid for cooperation among all peoples Further meet ings will take plrce as planning leads to action. The aims of the organization are rais ing world nutrition levels and standards of living improving methods of farming to make the most of land and above bettering conditions of farm populations expanding world trade.

Some people like Thomas Malthus of the last century—a noted political economist and teaches—believe that the populations of the world must necessarily grow faster than food to feed them and that convequently starvation must always be present But Malthus gloomy prediction of a starving world did not foresee the possibilities of science





Radcap Fayur a champlen milk producer points the way toward a plentiful we ld support of mile

He could not imagine the results research

would bring

He dut not drewn that a few hotanuts would pattently breed corn year after year until they had obtuned hibrids (cross breeds) which would produce several bun dred miles farther north than ever before would yield one fifth more per acre and one thard more for the farmer's labor than the best of the older types. He could not forese best of the older types. He could not forest high producing cuts that wouldn't he heart and high producing cuts that wouldn't have been also have been al

Receding of improved strains of animals which is much more difficult than plant breeding naturally ligs behind. The men of old time however would not have believed possible the improvement which has occurred in the dairy cow. The prude of co lonal Maryland was Old Five Pints named for her druly milk production. Now Mixtagal Laying guess her own v.ight in milk every two weeks—fifty five outsits a disj.

Behind the scenes of increased milk and fat production like this lie many stories such as the one starring the agricultural scientists who work at the Missouri Agricultural Ex periment Station. The men toiling here no ticed that in feeding a cow portions of an fedure compound called thyroxine there was an increase in the milk and fat supplied by the animal Goats were likewise affected However, the price of thyroxine was high Research workers at the station went to work on the problem and found the solution An artificial method of obtaining the substance was developed in which the proteins of skim milk are skillfully combined with iodine. This process brought the price down t i point where more dairymen could use the material and thereby increase the prodictivity of their herds. The common apple too received a pro-

duction just from the hand of agricultural science Growers of the eastern Linited States were losing many, dollars a year due to the fact that apples were dropping from the trees before they were rupe enough to be sent to market. These apples were known as 'bad drop ters'

The Beltsville Maryland, bortscullural station was interested in growth producing substituces (bormones) and their effects on [11sts 18 workers had done much abong those lines and had learned to use their substitution of the station of the statio

#### SCIENCE NOW ENOWS WHICH FOODS ARE REEDED FOR GOOD HEALTH

Until recently it was supposed that man needed only a few nutrients, fast carboly drates (brend, sugar etc.) proteins (in meats fish eggs etc.) and some minerals Today we know that we require many nutrient substances although some in only tiny quantities. Because a small group of scien tists his worked long years in painstaking research, we now know what foods people must have to be healthy and to resist disease.

What are the conditions which have led to the 'nexer nutrition' I Widespred dis eases which so one knew how to compete example, in the southern United 'states Hentally' depressed people with horrble sores over their bodies began to appear in large numbers throughout the new mill short to be the southern their bodies began to appear in large numbers throughout the new mill sort to be the condition of the southern the sort to be a sort to be a proceed to the sold to be a south of the south labor. For many years physicians tried to find the cause of this ull ress Many sondered if the monotonous diet largely corn pone, could be connected the southern the southern

A taying maniac suffering from pellagra is brought to the hospital. It takes three men to hold him in the ambulance. Besides his mental illness he has loathsome sores over his body. He is in such a state that his relatives can hope only that he will not ling?

long A few milligrams (thousandths of a gram) of a simple chemical compound-nic ottnic acid or macin for short-are injected into his blood stream. In seventy two hours he is himself again and his sores have begun

### A CURE FOR A DOGS DISPASE PROVIDES THE CITE TO THE CURE OF PETTAGRA

How has this magic cure been brought about when only a few years ago physicians were as helpless to cure pellagra as they now are with cancer? The discovery of a cure for the disease known as black tongte in dogs by C. A. Elveihern at the University of Wis consin led the way It was proved that this disease is related to pellagra in man The latter was found to be caused by the lack of a tiny quantity of macin which would have been supplied if milk lean meat turning greens or collards had been a part of the regular diet of these people Entirely differ ent then are these deficiency diseases from typhoid fever tuberculosis or malaria which are caused by living parasites that attack their victims

Deficiency diseases have long plagued mankind all over the world. One of the chief diffculties Christopher Columbus had to fight on long voyages was scurvy the most prevalent disease in Europe at that time Just a little later Vasco da Gama sailing around the Cape of Good Hope lost nearly two thirds of his crew by this disease Scur vy was found especially among sailors sol diers on campaigns and people in besieged cities People suffering from scurvy develop spongy gums their teeth become loose fall out The walls of their blood vessels break resulting in bleeding within the r bodies. In the Crimean War more lives were lost from scurvy than in all the bloody battles

Early observers noticed that folks who had plenty of fresh vegetables and citrus fruits did not have scurvy The early New England settlers struggled with this disease and learned to prevent it by eating fruits and sprouted grain One of the benefits some early colonists took back to England was the white potato When it was grown throughout Europe scurvy almost disappeared

In spite of the clue that this disease was connected with what people ate it was 300 years before the exact cause was understood C G King of the University of Pittsburgh discovered the scurvy fighting substance in 1932 and succeeded in making it It is known as vitamin C

The nutritionists are discovering more



apples The use of a new sp sy wo these apples on the tree until harvest time



S Department of Ag cultu Apples ready for picking Thanks to a spray the fruit did not fatt before ripesing

ibout this useful sitimum all the time. When taken in four to eight times the amount needed to prevent servey it is claimed to produce much better general health, and to help avoid such diseases as the common cold pneumonia and even tuberculosis.

As serious and widespread in Oriental countries as scurvy was in Europe beribers took a heavy toll of life in the I ast About 1880 a high medical officer of the Japanese pavy noticed that British sailors in the Pa cuic did not suffer from this disease which kept almost one half of his men on the sick list every year. He decided that the trouble must be with the diet of the Japanese Most Oriental people live largely on rice and white polished rice by choice. This officer sent two vessels on long voyages. Of the 276 men in the first 169 had beriber. The second ship with a similar crew be sent over the same route, but he changed their ration, He cut down the rice increased the barles and added meat vegetables and condensed milk Only ta men had beribers and each of them had refused to eat all of the new food Because of this experiment, the entire Japanese navy diet was changed and beriberi practically disas peared among them

In spite of this successful experiment there were nam, win eleft that the improvement might be due to better saintstion. A Dutch physician however working in the Fast In dies notice that chickens eating pollshed rice by da an illness similar to beriber! He made careful tests and found that be could produce beribert in poultry simply by feed ing pollshed ring.

### RICE HAS A BROWN OUTER COATING THAT CURES BERIBERI

In the Philippines physicians began to experiment along similar lines. It was found that beriber could be introduced by feeding hospital patients polished rice, or cure it by feeding rice with the brown outer coating left on This was indeed a forward star.

However, it took twenty five long tireless years before Pr. R. R. Williams succeeded in separating the pure substance that prevented beribert in working out its complicated chemical formula and in learning to make it synthetically (out of existing materials). This vitamin is called thamina 1t occurs in small quantities in many common foods, though richest in meats especially pork, whole grains and beans

It was Dr Russell M Wilder and others of the Mayo Clinic who proved by experiment that without thiamin in their diet hu

man beings lose their will to work become unico-operative intrible, quarrelsome. When thiamin is restored to their food they become well and normal within about time it come well and normal within about time it come will be the server of th

### A FAMOUS BREAKFAST THAT MADE CHILDREN GROW TALLER

In the serrch for a better understanding of nutrition many special experiments in feeling have been carried out. In Norway, where some school children were given an extra meal the average height of fourteen year-olds was increased by four inches. The Olo breakfast as this experimental meal was called consisted of milk, orange, whole wheat bread, 13 e biscuit, cheese, carrot and cod laver oil.

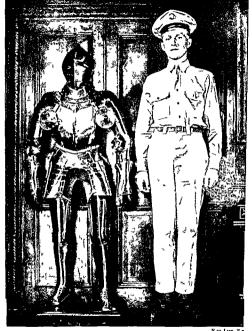
Throughout countries where nutrition has been improving in the list 100 years the size of the young men has been steadly in creamy Milariny recends prote that Americans Milariny recends prote that Americans of the size of the first World War. The American solder of today could not possibly have gotten not be affected by the sixteenihecture, warmers Perlaps they were not such enormous gautistics.

### MODERN ARMIES UNDERSTAND THE VALUE OF A GOOD DIET

Modern armes have sparred nothing in providing the best possible nutrition for their men. The German Covernment saw to it that the working people as well as the soldiers were well fed. It subsidized milk vegetables and pointors so that the poor could afford a good diet. That is the Government paid part of the cost of production to the farmer so that the price remained within the reich of all.

British nutritionists were quick to see the need of proxiding a healthy diet for all their people during the war. They advised their government likewise to subsidize the profess the foods, holding them at a price the poor est could afford. In spite of the bintz and the loss of ships by submarines, they maintained

## WARRIORS ARE GROWING TALLER





Like countiess other children this youngster in the Ph lippines needs her Red Cross gift of food

the health of their people. There were no epi demics such as that of influenza during World War I Most remarkable of all the people on the average were better fed than in peacetime Without such provision it is doubtful that Britain could have held out Commenting on Britain's war food policy Sir John Boyd Orr newly chosen director general of the United Nations Food and Agriculture Organization said 'We have examined the food position on the assump tion that the object of the war policy is to provide the whole population with a diet adequate for health. It is to be regretted that we d d not have such a policy in pre war days when food was actually or potentially so abundant that measures were taken to restrict the national supply '

We now know that the lack, of proper good way be larged responsible for guiden ics. It has been proved by experiment that protection to the body from infectious dis cases is chelly provided by plenty of protein in the diet. Proteins as we have seen are supplied especially by meat fish eggs chees and beans though small amounts are con tauned in most foods The British by providing their properties of the original intrinents of wheat, by and by greatly uncreased planting from and by greatly uncreased planting from the sax of higher proportion of the habes.

lived than ever before. In Scotland, the reduction in infant deaths was 20 per cent

The first set of the United States Ma-Food Administration was to require the enrendered of all breed according to the for mula recommended by the Food and Austra tion Board Nearly half of the states to drive have passed laws making the enrendment of bread pernanent and requiring also the enrendment of Board Several of the southern states have passed smilar laws requiring the enrichment of foor med. If enrichment were universal pellagra would be wiped out entrely

As a result of advances in the arts of agriculture the United States broke all recolor for food production in each of the years be gunning with 1937 and continuing through the war. Each year a bigger crop was har vested than ever before and this record breaking was an important element in the victory over Germany and Japan

These feats were accomplished in spite of serious shortages of man power and ma chinery. The meaning for the future is plain When the boys are all home from the service and when new and improved machinery is readily available again. American food production will go on to dizzy heights and new records.

### MANY FACTORS WILL HELP TO GIVE US BETTER AND MORE PLENTIFUL FOOD

We are promised by the experts that before 1950 the United States and Canada will be faced with the problem of gigantic food surpluses Progress in science will make sure that this food is in the triest sense better than ever before Agriculture will then face a battle royal in marketing these products

The average but er in Chicago on Thurs day will have his choice of oranges picked on Wednesday in California or Florida Plant ripened Texas strawbernes will be hardly more than a day from any place in the Unit ed States as air transport whittles the farmer to-consumer time

A fast growing industrial child is the quick freezing operation. It to pens usat fields to agriculture. As the change-over from war time to peacetime manufacturing permits and the pension of the pensio

further brighten the prospects

Rosy as this picture seems there is a cloud on the horizon Generations hence people will find it hard to believe that come of their ancestors of the 1920's and there outlet out of sold while others could not sell the food they raised Right now in spite of surpluses that face agriculture in the United States and Canada there is still the threat of famine in other portions of the earth

The Hot Springs Conference of the United Nations estimated that almost twice as much food as the world produces at present is needed to feed the world properly. This is a tremendous order. Can it be done?

The conference report suggests how it can be done. Wost of the methods it lists are not new Rather they recommend going further on what has already proved successful (1) more of modern agricultural mach nery with credit made more easily available on that farmers can buy what they need (2) more lands to be brought under cultivation (3) better breeds of cattle (4) better seed for crops (5) more and better soil conservation (1) performed the wascing away of our lands to perform the wascing away of our lands the lands to perform the wascing away of our lands the wascing awa

### WORKING TOGETHER NATIONS CAN ASSURE A FAIR RETURN FOR THE FARMER

This world wide program the conference points out can succeed only in ations soci, together the more fortunate countries mak ing loans and guing technical assistance to those less developed. Only by international trate on a greater scale than ever before with a fair return for the farmer can the would solve the problem of the farmer and as the farmer prospers so prospers the whole ration.

One part of the plan is comparatively new that of shifting farming more toward foxl production \(^1\) good example would be grown g less cotton in the undernourished southeastern United States and more protective foods

Bennark successfully made such a change years ago When Brits a stopped tuying bansh wheat in order to favor the Canadian farm ers. Dennark was left in reil district, With courage and vision the Danes then entered a help-one another way of life (co-operative system) that saw them raise begs an I will roughly the best party. try without any great natural resources such as forests coal or munerals yet she has solved the problem of living. Her people as a whole are now better fed have better med real care and are better educated than any other country in the world except neighboring Scandmaysian countries.

### SHOULD AMERICAN AND CANADIAN FARMERS PLAN TO PRODUCE FOR EXPORT?

American and Canadian farmers today are enjoying a living standard well above that of former years. Farm income is higher than ever. This is chiefly because agriculture in these countries is producing for export as well as for home consumption. And in the words of Dr. G. S. H. Barton deputy min sister of the Canadian Department of Agriculture. If farmers do not continue to plan production for export to give the over eas buyer what he wants then the farm standard of fung can not before by the given in the contraction of t

The solution of agricultures of ficulties les in supplying food to all the people who need it but the process is a vast and compilicated one. The experience of the past shows that the mad rush of nations to become self sufficient and to maintain high tx walls be tween themselves and the rest of the world destrops their expert trade. This must not happen again.

If the United Nations set themselves to the great task of finding ways and mean 1) feed all the peoples of the errth the good which can result could not be mersured. The alone would go a long way toward abolishing war. For just as long as great populations are huntry there can be no stable peace.

The practical effect of feeding all peoples would be as much a help to agriculture as to the hungry With a reasonable return to the farmer and with a fair adjustment between industry and agriculture such a program of increased food production would spell prospertiv for all people

President of the Lintel States Harry S. Truman in an address to the Unitel Nations Food and Agriculture Organization meeting at Quebec sail that this was an organization and cated to achieving two ambitions through common effort and sarriface. First that people in all parts of the world can and should have plenty of food and of other products of the farm and second that the world's people who draw wealth from the earth an liset can and should enjoy their fair share of the pool thongs of life.

These are high pouls the challenge faces world agricul ure an i world government





# Science Looks at Paintinas

lis Murray Pease, Inmuste Curater

Department of Conservation and Technical Research The Metropolitan Museum of Art M (N) wise howks have been written to explain how artists paint pictures and how we ought to look at them II we could read all of them we mucht become very learned indeed on the subject of art. But all we really need to remember is that artists love to paint pictures and want us to enjoy them. This will slwavs be the truest and best reason for looking at paintings. Most people need no ther reason

But for some of us there are special reasons for looking at ruintings and special ways of doing so. In art museums there are many paintings some of them hundreds of years of 1 Museums must preserve these and the others not yet so old so that they will exist and give pleasure perhaps hundreds of years from now To do this those who work in museums must know just how the paint ings were made and of course must Ind it out without damaging them in any way Much can be found out by reading old books and records. The museum workers can find out even more by studying the maintines themselves very carefully-studying them, for the time being not as beautiful point ings, but as things which have been built from wood and canvas and give and point just as chairs or tables are built. The more they find out about the materials of naint ings and how the artists put them together the better they will know how to take care of them-and the more they will admire them too, because good paintings have beau ty of fine workmanship as well as beauty of color and design

In all this the museum workers are rather like doctors who also must examine their patients before they can try to take care of them Many of the special instruments that doctors use are helpful in examining paintings One of the most useful is the microscope. This can make tiny details of brush work appear large enough to be compared with similar parts of other paintings. It can show us old damages, perhaps so skillfully repaired that they might otherwise be over

looked. It also makes it possible for us to take samples of the point so small that you could not see them or tell where they came from without a magnifying glass and ana lyze them chemically to find out what kind of name the artist used

But we may also want to find out about the layers in a painting that are underneath the point surface where they can not be seen with the eye or the microscope. There are two usual ways of exploring these hidden parts without damaging the painting One is s infrared photographs the other is Is Years Both of these methods use invisible rays or waves or radiations. Although we can not see them, these rays are in many ways quite like visible light. For example, they can be used to make pictures on photographic film. They are different from light in being able to pass through many materials that light will not pass through So by using these properties in combination, we can make real photographs of inner parts of paintings just as doctors can take A ray pictures of internal parts of human beings

Each of these methods has its own special uses Infrared rays although they will travel farther through solid or opaque materials than ordinary light are still far less pene-trating than arays So infrared rays are what we use when we want to see just a little was down below the surface of a painting Why should we want to do this? There are several reasons why we might. One is to find out whether the artist changed his mind while painting and perhaps covered up parts already begun Being unfinished these parts, if we could see them, would tell us quite a lot about the artist's methods. We might per haps hope to discover something that would add to our knowledge of the painting s his

At the top of this page are two kinds of photographs of a small place in one cor ner of a painting. This strange place looks as if it ought to have some writing on it But when you look at it, there is almost

## HOW TINTORETTO CHANGED HIS PAINTING



This is how the painting of the Dogo Aivise Mocenigo Presented to the pedesence would appear to use it we stood before it at the Metropolitan Moseum of Art. The areas photographed by infrared and by X rays are marked by white hiere and are above helper Experted Authorities Authorities and the Action was deep white hiere and are above helper Experted Authorities and the Authorities and Authoritie



This X ray shadowgraph of an apparently empty apace shows the figure of a man believed to be St. Mark. The cross shaped area is the shadow of the stretcher that supports the canvas.



Infrared says bring out the figure of an ange herering over the Dage. The painter evidently thanged his mind about the p sture's composition

nothing to be seen, is the ordinary photograph shows. The infrared photograph, how ever, tells a different story. It shows very clearly indeed that there is writing there, bursed below the surface of the paint. It is the signature of the artist who painted the picture more than four hundred years ago flow or why it was covered up, we can only guess, but now at least we know it is there It is in I atin, and means "The Work of Vit tore Carpaccio of Venice" Vittore Carpaccio was a painter who lived in Venice at the becurning of the sixteenth century

#### MUSEUM WORKERS THOUGHT IT STRANGE THAT ST MARK WAS NOT IN THE PICTURE

On page 23 you will find an illustration of a well-known painting by another great Ve-netian artist Tintoretto It is an imaginary scene in which a famous Doge (chief magistrate) of Venice is being presented to the Redeemer by four saints. It is a partly finished study for a larger painting. It has all ways seemed surprising that St. Mark who is the patron saint of Venice, was not in the picture, especially since his symbol, the hon, can be seen in the shadows. But now look at the picture of the infrared photograph of the empty space to the left of the Doge Here are shadowy traces of one or more figures that are not to be seen on the surface. This helps us to guess that Tintoretto began his design with other figures, probably St. Mark and an angel, in this space, and then, deciding that it made a poor composition, painted them over Because this had already been suspected for other reasons, a small part of the over paint has been removed from the head of the upper figure, showing part of a face just sketched in It is near the upper right hand corner, and looks as if it might have been planned to be a hovering angel I RAYS OR "SHADOWGRAPHS" DO NOT

### SHOW TONES OR COLORS OF PAINT

Between infrared photographs and X ray pictures there is an important difference. As you can see, infrared photographs look quite like ordinary ones-both of them show the colors of the paint, changed into black and white But Y ray pictures (which are usu-ally called "radiographs" or "shadowgraphs') do not show the colors or tones of the paint at all To understand this we must know how they are made To make a radiograph, the rays from the X ray tube nass through the painting and strike a sheet of photographic film which is placed on the other side On their way through, some of the rays are stopped by the thicker paint especially if it contains metal compounds such as white lead (white lead is one of the commonest of white pigments, it was used in almost all old paintings). The rays that are stopped do not reach the film, and so parts of it are not exposed, while others are When we develop the film, therefore, we can see a pattern of shadows, which are the shadows of the paint itself. Of course, it makes no difference whether the paint is on the surface or not wherever it is, it will cast its shadow on the film It is true that radiographs often look quite like the paintings from which they are made But this is only because we usually study the X-ray nega tives, without bothering to make prints from them In the negative the shadows are light instead of dark, and so they look like the white paint that made them

### THE SHADOWGRAPH REVEALED THE FIGURE OF A MAN INVISIBLE TO OUR EYES

One picture on page 23 is an X ray shadowgraph of a part of the same painting by Tintoretto It includes the part near the Doge's head, where we might expect to find the figure of St. Mark if our guess was correct If you look at it for a while, you will see the upper part of a man, seen from the back He carries a great book under his left arm, and leans to the right, toward the fig ute of the Doge We can now be quite sure that this was intended to be St. Mark, with the book of his Gospel and with his hon at his feet. The pale cross-shaped area is the shadow of the wooden stretcher that supports the canvas The small black spots that you can see here and there are holes in the paint

#### OUR EYES AND OUR MINDS THE REST INSTRUMENTS FOR STUDYING PAINTINGS

What do we really learn from such photographs as these? Not very much, perhaps but when we add this information to all that we have discovered by other means, we may find that we have learned a great deal At times these "scientific" methods will not help us, for most paintings have no hidden se crets, and all the X rays and infrared photographs in the world will tell us no more about them than a sensible use of our eyes In fact our eyes and our minds will always be the best 'instruments" for looking at paintings-or at anything else We must learn to use them wisely and thoughtfully, and then we shall be able to use other instruments in the same way



eral MacArthur and President Osmena rejoice over the liberation of the Philippines won by land sea and air

# ASIA and the PACIFIC AREAS

By H R Ekins

THE year 1045 saw the destruction of the vast empire that Japan had built up in Asia In the early months of the year the Japanes suffered a series of disastrous defeats British Empire troops conquered Burma after a difficult campaign in dense jungle country Australians invaded the huge sland of Borno-American forces drove the sland of Jorno-American forces drove the Jahan of Japanes had been after the property of the Philippine Islands they captured two Island and invaded Okinawa in the Ryukya group Japans once mighty navy was reduced to a few battered ships American bombing planes kept pounding away at the Japanese homeland and they caused terrible

By E Day, the day of victory in Europe (May 8 1945) Japan was already a beaten country She faced redoubled attacks by the United States and Great Britain who were now free to direct against Japan the armes that had been used against the Germans In the months that followed Americans the Germans In the months that followed Americans and British gathered their armies for the final attack.

On August 5 1945 the United States launched a terrible new weapon against the Japanese An American Superfortress dropped a single atomic bomb upon the city of Hiroshima. The explosion caused by the smashing of atoms brought about fearful damage. An area of over four square miles was flattened out more than 100 000 per sons lost their lives August 8 1045 was a black day in Japa

nese instory. On that day another atomic bomb was dropped this time on Nagasaki On that day too Russia declared war on Japan and at once attacked the Japanese positions in Manchuria or Manchukio. The Japanese now realized that further resistance was useless. On August 10 they offered to surrender they asked only that their emperor should be left on the throne of Japan

The Allies agreed to let the Emperor remain But they made at clear that this mon arch was to be a mere pupper acting under the orders of the Allied supreme commander On August 14 the Japanese accepted these terms. The official surrender tool place on the deck of the battleship Vissouri in Tokvo Bay on September 1, 1931 out time? Since the Bay on September 1, 1931 out time? Since teme Spriember 2 was harded as 1 f Day the day of final victory over Japan It also marked the end of World War II the most destructive in the history of mankind

The end of the war did not bring peace to Asia In the regions freed from Japan there was want and misery as the result of years of brutal Japanese occupation. There was great unrest too in many of the occupied areas. In part this unrest had been stirred up by the Japanese They had done their best to turn the peoples of the Netherlands Fast Ind es French Indo China and the British possessions of Malaya and Burma against their former white masters. The Japanese had prom sed to built up a Greater East Asia Co prosperity Sphere in which all na tive peoples would live happ by under Japa nese leadersh p

In the course of time these peoples had found out that the Japanese were hard task masters who were interested only in adding to the r own power and wealth But the Japanese had succeeded in bringing to a head a movement that had been gaining ground for years. It reflected the desire of the peoples of Asia to be their own masters it was summed up by the cry of Asia for the Asiatics

This movement had been particularly strong in Inda where national st groups had been demand ng independence long be fore the outbreak of World War II With the com ng of peace the demand for political freedom grew more insistent not only in India but wherever the powers of Europe

ruled over As at cs Elsewhere in Asia too the year 1945 was marked by turmoil There was civil war in Ch na revolution in Iran open combat in Syria and Lebanon rioting in Palestine In the pages that follow we shall tell you about these developments and about other important happenings of the year in the vast 'ssi

atic cont nent

outposts of Asia those numberless islands which dot the immense Pacific Ocean and to which we give the name of Oceania A great many of the islands were wrested from the Japanese in the course of the war Among these were the groups of the Solomons the Bismarcks the Gilberts the Carolines the Marshalls the Marianas and the Halma heras Some of these islands had been con quered by the Japanese in 1941 and 1942 Others had been under Japanese rule before the war

What will become of these islands? Some are now governed again by their former rul ers-Great Britain the United States and the Commonwealth of Australia The fate of the others must await the decision of the Trusteeship Council of the United Nations Organization (See the United Nations ) A number of the islands will probably become American m litary and naval bases under trusteeships awarded by the United Nations

Organization In some of the islands of Oceania life will return to the old ways of peace. In others there will be new developments. The islands on the air routes between the United States and Asia will flourish as stopping places for travelers as tourist resorts and as bases with

permanent military and naval installations We now come to the Philippine Islands which are separated from the Asiatic conti nent by the broad South China Sea To many native peoples the coming of the Japa nese meant merely a change of masters to

the Filipinos it was a tragic blow



S gnat Co pe photo

ATPA



U S Mar ne Corps photo The natives of an Oki nawa village trudge over atony ground in bare teet, apparently without discomfort. Almost all wear kimonas but with out the famous sash of Japanese women

Spain they had been taken over by the United States after the Sponnsh American War of 1898 Under American rule the Filipinos enjoyed the benefits of education et tensive health programs and training in self government. In 1934 the United States Congress passed the Tydings McDuffle Act which gave mercased political power to the Filipinos it also provided that the Islands were to become medpendent by July 4, 1946. The Filipinos had their own president and vice-president their own congress. They looked forward confidently to the day of complete independence.

The Japanese invasion dashed their hopes In the dark days of 1041 as when Japanese troops overran the islands the great ma jointy of the Flipinos remained loyal to the United States President Manuel L. Quezón and Vice President Sergio Osmena escaped to the United States where they set up a Flipino government in exile In the islands groups of Flipino guerrillas co-operating with Americans kept up the fight against Japan after all organized resistance on the islands had come to an end

The Japanese promised to include the Filipinos in their Greater East Asia Co prosperity Sphere they even set up a pupper tepublic under Jose P Laurel But they made it clear that they were the real masters and they aroused the firece hostility of the proud Filipinos When the Americans invaded the islands in October 1944 their task was greatly lightened by the co-operation of the inhabitants As a result flather.

occupation of the islands went on rapidly The Americans did not treat the Filipinos like a conquered people but like faithful and trusted allies in February, 1945 Gen eral of the Army Douglas MacArthur leader of the American forces turned over the civil government of the islands to the Filipinos themselves President Quezon had died in August 1944 and had been succeeded by Vice President Osmena Lnder Osmena the Filipinos set to work to rebuild their land

If was a heart breaking task. The Japan ness had rasqued fine cities like. Vanila Baguio Cebu and Ilolo they had burned hundreds of villages. They had laid waste the sugar-cane plantations in many areas and had destroyed the machinery used in refining sugar. It was necessary to find food and sheller for the victins of Japanese oppression. It was necessary to restore Filippino suor I was necessary to restore Filippino suora publicity.

Yet the Fulpmos were hopeful They had the and of their good friends the Americans who provided money relief susplies goods and helpful suggestions. The Filipmos planned to elect a new congress early in 1946 the year set for their independence. They are looking forward to an era of peace and prospectify as members of the United Nations Organization.

North of the Philipmone lies Isanan now

stripped of her conquests and her power She is the ched victim of the war that also had brought on so hopefully. Although the Japanese home slands were not maded until after the final surrender, the chief cities and dwns of "Appar were hauf want by bombing from the air and shelling from the sea. There are not nearly enough formed in Japan there is not nearly enough food it searches and the season of the s

but he has no power He must obey the orders of the supreme Allied com mander General of the Army Douglas Mac \r thur who has a strong oc cupat on force of Ameri can soldiers to back up his



or no A caft Company The R 29 Superfurtress

commands At first the oc cupation of Japan was an American affair Other countries were represented on a Far Eastern Advisory Comm ssion which would make recommendations concerning the Ian anese problem but General MacArthur made all the decisions. He followed a directive (statement of policy) issued by President Truman on September 6 1945 autl n ng

these policies On December 27 1945 an important an nouncement was made by the Moscow Conference of Foreign Ministers representing the United States Creat Britain and Russia, It was revealed that an agreement had been reached to set up a four man All ed Counc I for Japan The American representative would be the supreme All ed commander in Japan he would be the permanent chairman Russia and Ch na would also be represented on the Council a fourth member would speak for the United Kingdom Australia and New Zealand The supreme All ed com mander would still have great power. But in

certain important matters no decision could be reached without the unan imous approval of the Council

In 1045 all the impor tant decisions were made by General MacArthur

who followed the Presi dent's directive. The General has won great admiration for his work in uprooting Japa nese militarism. He has taken away from the Iapanese the guns warships airplanes and munitions factories which served them in their campaign of terrorism in the Far Fast He has done away with the Japa nese Imperial General Staff He has seized the banks which financed Japan's military activities. He has caused the arrest of a number of Japanese war criminals-that is men guilty of planning or carrying out the attack on the Allies or guilty of crimes

He has taken other steps to bring about changes in the Japanese way of life He has demanded that free elections should be held that Japanese women should be granted the vote that labor unions should be encour aged He has insisted that all Japanese must have freedom of speech he has abolished the dreaded secret police. He has forb dden the teaching of mil taristic doctrines The atomic bomb left nothing but rubble and twisted metal to show that people once lived to this part of Kiroshim-

against humanity in the course of the war

We have told the Japrnese that defeat in war has brought them the opportunity to win the benefits of true democracy. But democracy is a new and strange word to this people. Only time can tell whether the Japanese will benefit by the new freedom. At present they are stumed by defeat and in their hearts they are bitter. As time goes on however they may time from the old ways of untibanking nationalism and brutal militarism. They may entire upon a new path of peace and to operation with the nations of the world. Such at least is the earnest hope of their conjugate.

With the defeat of Japan Korea was freed at last from the Japinese yoke Korea a country on the Assatic mainland was an nexed to Japan in 1910 but Korean patriots never gave up the fight for their lost liberty. When President Roosevelt Prime Vinister Churchill and Generalissimo Charlang Kaishelmet at Cairo Egypt in December

1943 they promised that in due course Korea would again be free

The downfall of Japan did not bring in dependence to the Aoreans Their country became an occupied territory with American troops in the south and Russians in the north In December the Moscow Conference of Foreign Munisters proposed a five year trusteeship plan under the United Nations Organization for Korea The Koreans roted when they heard about this proposal they demanded immediate independence

## NEW PROSPERITY FOR

Japan s negabor to the north is Russia which is very definitely an Asautc power as well as a European one Asautc Russia has benefited greatly by the war. In the many the second of the

There is no prosperity, alas in the ancient land of China Those of us who have lived in China have known for a long time that the end of the war against Japan would mean the continuation of the revolution which began in the year 1911. The original revolution shook off the rule of China's Man the imperiors and brought a republic to the



U S Navy photograph Japan surrenders formally aboard the USS Missouri

Chinese But unfortunately it did not bring peace When a strong man called Yuan Shih kai took over the presidency in 1912 he aroused the suspicion and then the hos tility of many of the revolutionaries

Civil war broke out in China and for years there was almost continuous fighting now in one area now in another. Different provincal rulers called tuchunt, or war lords raised armies of their own. They fought among themselves frequently changed suckes sold their support to the highest bridder and sometimes played the game of foreigners.

In the late 1920s Chma seemed about to regam her unity under the Kuomutang a nationalist party that aimed to restore Chma to the Chinese The leader of the Kuomi tang Chang Kai shek was a military gen us he succeeded in overcoming many of the war lords and in setting up a fairly strong central government Unfortunately there was trouble from several quarters. Japan in 1931 model the Chinese province of Manchuria and thereafter kept burn of a succeeding the control of t

When open war with Japan broke out in 1937 common hatred of the foe brought to gether the central (Kuomintang) govern



Chinese and Americans celebrate the arrival in Kunming of the first convoy over the Stilwell Road from Ledo.

ment and the Communists for a time But this patriotic alliance did not last very long In the terrible days when the Japanese thrust deeper and deeper into China the central government and the Communists drifted further apart. The Communists gov. erned vast areas independently they had their own laws currency and postage stamps they raised and equipped their own armies in defiance of the central government. The two hostile groups often came to blows

Russia had been accused of giving aid secretly to the Chinese Communists Many people were surprised therefore when she signed a treaty of friendship and alliance with the central government on August 14. 1045-the day when the war against Japan was brought to its close For a time it seemed that the Luomintang and the Com munists would bury the hatchet The Com munist chief Mao Tze tung arrived in Chungking, capital of the central govern ment, for a series of conferences which it was hoped would bring about peace in China

But nothing came of these meetings Even while these talks were going on. there was a race between the central gov ernment and the Communists to take over the areas which the Japanese were abandon

ing Open fighting broke out between the two Chinese groups in many areas American armed forces found themselves involved in some of these conflicts They co-operated with the central government in disarming the Japanese thousands of Chinese govern ment troops were transported in American planes to the areas which the Japanese had given up In 1945 China had at least the satisfaction

of regaining a vast region that had been lost to her for almost fifteen years because of Japanese aggression—the province of Manchuria The Japanese had set up a puppet state, called Manchukuo, in this area Strong Japanese forces were stationed here throughout the war

When the Russians declared war on Japan on August 8, 1945, their troops invaded Manchuria and overran the region in a few days Since Russia had been vitally inter ested in Manchuria for a long time, few people expected that the Red Army would give up its hold on the province. But it did so and there was considerable fightens, be. tween the government troops and the Communists as each group sought to take ove the province Before the end of the year, the central government had won the upper hand over the Communists in this disputed area China also regained the territory of kwangchowan in the southeast This terri tory had been leased to the French in 1800 for a period of ninety nine years. On August 18 1945 the French agreed to give up all claims to Kwangchowan The Chinese hoped also to take over Hong Kong which had been a British crown colony for many years and had been captured by the Japanese in December, 1941 But the British announced that they had no intention of giving up

As 1045 came to an end there was renewed hope that the central government and the Communists would come to terms President Truman sent General of the Army George C Marshall former American thief of staff to China as ambassador in order to try to bring the two warring factions together. As they both hailed the selection of General Marshall it was hoped that he would be able to bring

Hong Kong and the Chinese allowed them

peace to the land

to reoccupy the colony

There was grim fighting in southeastern Asia after the end of the war The natives of the densely populated and fertile Neth erlands East Indies staged a full scale revolt against the Dutch rulers of the land The area had been overrun by the Japanese in the early months of 1042 The Japanese suc ceeded in turning many of the natives against the Dutch The doctrine of Asia for the Asiatics seemed to them a very reasonable one They scorned the offer of the Dutch to give dominion status to the Netherlands East Indies after the war

When peace came at last a number of the natives led by Dr Achmed Soekarno an nounced that they intended to set up an in

dependent government When the Dutch tried to reoccupy the islands wild rioting and general disorder broke out. The British landed troops in order to help the Dutch and in some places particularly in Surabaya a big naval base there was heavy fighting The British used tanks and bombing planes and many lives were lost

The British and Dutch claimed that it was impossible in a land where there were still many armed Japanese to turn over re sponsibility for preserving law and order to a native group. Some of the revolting natives doubtless were lawless persons who took ad vantage of the troubled times to steal and kill others were trouble makers who had worked with the Japanese But many of those who demanded independence consid ered themselves to be patriots fighting for the right to be free They said that they wanted to develop the resources of the land for the benefit of the inhab tants not for the beneft of a foreign power

There was unrest and revolt too in French Indo China The people of the Indo Chinese protectorate of Annam sought com plete independence from French rule Riot ing broke out and here too British troops helped to mainta n order A new Annamese Nationalist Government headed by Dr Tran Phan was formed in Hanoi in October 1945 It won wide support among the natives but it could not oppose the French successfully on the field of battle Dr Phan declared bitterly that the French were using tanks and other supplies sent from America on Lend Lease

India remained a trouble center in Asia as it had been for years. In 1042, at a time when Japan was extending her conquests in



Near Calcutta. India where the heat is stifting for a good part of the year many of the people live in thatthed batts. Very young children wear no clothing and that of the grownope is loose and light in color

the Far Lus Great Britain had offered India full dominion status after the war in exchange for active Indian co-operation against Japan This project was cilled the Cripps plu because it had been brought to India by Sir Stafford Cripps a member of the British Culmet

India rejected the Cripos plan chiefly be cause the British wanted to control India a defenses In August 1942 the All India Con gress authorized its leader Abhandas K. Landhi to begin a campaign of civil dis obselhence which was intended to put ano obselhence which was intended to put and end to British rule in In ita Crindha Java haril Ashria and other leaders of the Con gress were imprisoned and Great Britain sternly out down the notions which followed:

In June 1945 the British released Nebru and other prominent Indian leaders from prison. In that month too they begin a series of conferences it Sinh suit these leuders and other Indian representatives in an eff it to bring about a new eri of perce and co-operation in India. But these meet image nel of in failure on July 14 and the British announced that they would continue to govern India as before

### THE NEW BRITISH GOVERNMENT KEEPS THE OLD INDIAN POLICY

The stuation was not changed much after a Labour government came into power in Great Britain in July II soon became clear that the new government would make no important changes in British policy in India The Indian Jederes were butter there were anti British riots in Calcutta and other cities To add to the woes of India Hindus and Moslems came to blows in a series of rots in Rombay in Sottember 100.

Farther to the west the historic land of Iran (Iersa) faced a difficult situation II had passed through trying times in World War II. In the early months of 1941 a considerable number of German agents posing as tourists had flocked into the country Great Britain and Russix who became allies in the war against the Avis in Jine 1941 in the war against the Avis in Jine 1941 they demanded that Iran should make all they demanded that Iran should m

When this demand was refused British and Russian troops invaded the land and occupied it meeting bittle resistance. The Drinish and 'Russians study over the oil fields a number of bases and other places in Iran In the course of time the country became an all important channel for the flow of war materials to Russia American troops sometime.

the British and Russians in this area in order to help keep transportation moving. The limmins declared war on Germany in Septem ber 1943 but Iran continued to be an occupied country with little power to decide its own policies.

La the damous conference held in Teheran the capital of Iran from November 2 to December 1 pd. Presidert Rosseeld Irane Minister churchill and Premer Joseph Stalin promised that Iran would continue to be an independent country. They also promised that she would lose no territory as a result of the Allied occupation.

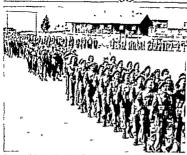
After the war came to an end at last British Russian and American troops on tinued to occup, key posts in Iran In Octo ber 1943 however they agreed to without their troops by March 2 1946 The people of Iran waited patiently for that happy day to come

out in Azerbaijan Province in the northwest of Iran occupied by Russian troops, When government troops tried to enter the prov ince in order to put down the revolt, they were turned back by the Russians. The gov ernment of Iran protested claiming that Russia had no right to interfere in a matter that concerned only Iranians On November 24 President Truman proposed that all American British and Russian troops should withdraw from the country by January 1, 1046 in order to lessen the possibility of unfortunate incidents But petther Russia nor Great Britain accepted the plan In De cember the rebels set up an autonomous (self governing) state in Azerbaijan

## TURKEY AND RUSSIA QUARREL OVER THE DARDANELLES

Turkey also had a quarrel with her his Ressan neighbor in 1923, over the question of the Bosporus and the Dardanelles. The-Example of the Bosporus and the Dardanelles. The-Example of the Black Sea with the Mediterranean Turkey had been forced to remove all the fortifications from the straits after World War I, in which limits the straits after World War I, in which Central Prosers But in 1926 following an international conference held at Monitory Trance, the Turks recrewed permission to

Fortify the straits again
Furkey remained neutral during ailmest
all of World War II she did not go to war
until February 23, 1945 when she joined the
Allies only a few months before V E Day
the day of final victory in Europe The



Jewish brigade formed the the permission of British authorities to

ments in Palestine

Russians did not welcome the Turks as allies They declared that Turkey had permitted Axis ships to pass through the straits in the early days of the war

Russia now demanded the right to set up bases at the stratis in order to protect her interests The Turk's were naturally reluctant to have so powerful a neighbor at their back door and they refused the Russian demand In November 1945 Secretary of State Byrmes of the United States proposed a compromise He suggested that the Russians should give up their idea of establishing bases at the stratus on the other hand he asked at the stratus of the other hand he asked the stratus of the other strategies and to the war shops of Russian Bulgaria and Rumanna at all times No action had been taken on this proposal at the years end

The Viddle East also offered serous problems in 1945. There was strile in Syria and Lebanon at the eastern end of the Viedleter ranean Sea Beorte World War II these comtries were under the control of France though they were called independent After the surrender of France in June 1940. Syria and Lebanon remained under the control of the Vichy Government which had taken over the rule of unoccupied France.

In June 1941 an Allied expedition took over both countries in order to prevent the Axis powers from seizing them. This expedition was made up of British Empire troops and pro-Ally Free French forces. In September 1941 General Catroux the com mander of the Free French troops in the area proclaimed the independence of Syria and Lebanon in the name of the Allies

and Lebanon in the name of the Alifes After V E Day a criss developed French troops continued to occupy a number of districts in Syria and Lebanon Before finally withdrawing their troops the French wanted to be guaranteed special rights in both counters. The Syrians and Lebanese however wanted to cast off all thes with France. When the French sent added troops into the area heavy fighting backers, in the course of heavy fighting backers, in the course of Damascius, Syria which is held sarred by the Syrians. At last the British intervened they ordered the French troops to return to their barracks.

The British restored order after several hundred persons had been killed and many others wounded On July 25 2045 an agreement was reached between the British and the French The French were to remain in the coastal areas but were to withdraw from eastern Syrax though they were to retain In December Crest British and France agreed to nithdraw their troops from Syrax and Lebanon at an early date.

The Palestine problem was the thorniest of all in the Middle East. Great Britain has been governing this country for years under a mandate of the old League of Nations. (A mandate was an order or commission issued mandate was an order or commission.)

by the League at authorized a League mem ber to set up a responsible go ernment in a given territory ) When this mandate was off citily approved in 1923 it was understood that the British would help the Jens to set up a national home in Palestine Sir Arthur Balfour British Loreign Secretary had promised in 1917 that the British (sovern ment would do all in its power to bring this

When the British took over the Palestine mandate the Arabs in that Lind greatly out numbered the less. The proportion of lews increased considerably in the years that fell lowed as Jews arrived in Palestine in increas ing numbers. The newcomers helped to buil! up the land and brought new prosperity to it But the Aril checame more and more hostile. They claimed that they would be outnumbered by the Jews in time if un restricted immigration continued might then become a persecuted minority And so they wanted to check Jewish immi gration to the Hely Land as lalestine is sometimes called

As time went on there was rioting and bloodshed in the Holy Land In May 1010 the British offered a plan to put an end to the strife between Arabs and Jews this plan was set forth in a document called a White l aper. The British proposed to allow 75 000 Jews to enter the country over a perixl of five years. Mer that time there would be no more Jewish immigration. The British would then set up an independent I alestine bound by treaty to Great Britain The Jews were to have full political rights in this new state

### WORLD WAR II POSTPONES THE PROBLEM OF PALESTINE

The White Paper satisfied neither the Arabs nor the Jews But in September 1010 World War II broke out and the British postponed further discussion of the Palestine question During the war the Jews of I ales tine supported the Albed cause wholeheart edly They sent their young men to fight against the Axis their industries helped to

supply the Allied troops in the Middle Fast With the end of the war, the matter of the future of Palestine came up again An im portant Jewish body, the Jewish Agency laid a definite program before the British Government Among other things the agency demanded that a Jewish state should be set up in the Holy Land, and that unrestricted Jewish immigration should be permitted In August 1945 this program was approved by the delegates to the World Zionist Confer

ence, meeting at Land in (/i mists are Jews who support the Jewish colonization move ment in Palestine )

### CONFLICT DEVELOPS OVER JEWISH INNICRATION INTO PALESTINE

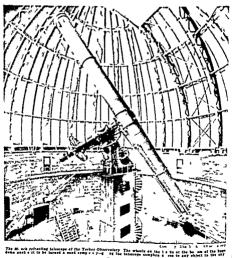
The lewish Agency program was a long range affair. In order to meet the immediate reeds of Jewish refugees in the war torn areas of Europe the Zionists demanded that 100 000 Jews should be admitted at once Into Palestine The British refused they an nounced however that 1 500 Jewish im migrants a month would be permitted to enter The Zionists declared that this offer was entirely unsatisfactory

The Arabs of Lalestine were bitterly opposed to the program set forth by the Jew ish Agency They received the firm support of their fellow Arabs in other lands. In March, 1945 the states of Fgypt Syria Lebanon Transjordanta Iran and Saud Arabia had adopted the charter of a new Arab League The League vowed that it would not permit the setting up of a Jewish state in Palestine To show their support of the Lalestinian Arabs Arab mobs in Cairo Mexandria Tripoli and other cities of North Africa looted Jewish stores, damaged syns gogues and attacked Jews

On November 13 1945 President Truman and Foreign Minister Bevin of Great Britain announced a British American agreement on the subject of Palestine They proposed to set up a Joint Committee of Inquiry to ex amine the problem of Furopean Jews and Palestine Besin added that I alestine would become a trustee state of the United Nations Organization and that it would have self government in time It seems likely that there will be no further official move in the matter until the Joint Committee of Inquiry makes its report

One reason why the Palestine question is such a difficult one is that neither Great Britain nor the United States is willing to make enemies of the nations belonging to the Arab League There are vast oil deposits in Iraq and Saudi Arabia and other Arab lands in the Middle East and both the Brit ish and the United States are vitally inter ested in these oil deposits

And so the vast continent of Asia is in turmoil Still the situation is not hopeless. There is still hope of peace-a real peaceif the reasonable hopes of native peoples are fulfilled and if purely national interests give way to the interests of the world family of nations



[37]

the light of the moon falling athwart the telescope and the floor, gives us light for our steps, although a dim, ruddy lamp on the pier serves as a guide

There by that lamp at last we pause Over us the monstrous shape of the giant instru ment looms, it seems to be motionless vet before us, inside the pier of the telescope. behind a window of glass we see the whiling gears of a mechanism called the driving clock that is turning the telescope with infinite smoothness slowly across the sky toward the west, to follow the apparent motion of the moon or any other object to which the instrument is pointed. For the earth is always rolling eastward beneath the stars, carrying us with it, as a result, the stars all appear to roll westward over us and if our telescope were not moved constantly to follow this westward motion, the object under examina tion would drift away from the field of view of the telescope

But now, after the astronomer has pressed a button on a small panel near the pier, we hear a rumbling sound, then feel a strange sensation of motion We are rising! The whole great floor of the room is an elevator that carries all of us, and chairs, and observ ing ladders, up to a convenient level so the lower end of the telescope is within easy reach! It is the largest elevator in the world it is circular and it has a square hole in the middle of it Through this hole the mer of the telescope protrudes, the instrument sits

Coursesy, The Yerkes Of servatory

This telescope peering through the slit in the arched lone is helping to discover the secrets of the sky

on a solid foundation buried in the earth while the floor does not touch it. For if the floor touched the pier of the telescope every step would cause the instrument to vibrate



A section of the Milky Way seen through a telescone

and the vibration magnified many times by the telescope would be easily visible to the observer using the instrument No part of the telescope ever touches any part of the huilding

Now we see that if we walk away from the center, toward the lower end of the telescope we shall just be able to look through it without standing on any steps. The rumbling sound ceases as the astronomer takes his finger from the button, and we all go out to look through the instrument But now the edge of the slit that runs from the rim to the top of the dome is hiding some of the moon the astronomer touches another button and a different sound is heard. For a moment we feel that we are turning but then we realize that it is the dome which is turning a little so the moon s light falls full on the great lens of the telescope. The astronomer steps to the lower end of the telescope, looks through the tiny lens called the eveniece, makes a small adjustment, then invites us one by one to share the view

### THE RAGGED MOUNTAINS OF THE MOON

When we first see the moon, our thoughts are strangely mixed. The scene is at once beautiful and terrible. There stand those ragged mountains those yawning craters and barren deserts where nothing has changed for millions of years, where nothing grows where the temperature by day is above the boiling point of water and by night is far below zero. Along the line that divides the dark



This telescope is used in photographing comets

from the bright portion of the moon we see long shadows that help us discern the nature of the details. The astronomer tells us that only when the moon is in some partial phase and the state of the state of the state of the there is no art and no water on the moon and that is why the seenery is so ruged and severe there has been no crosson there, no warmed down of the high places or filling in water We all agree that, also do wind and water We all agree that, also do wind and a fascinating object to view through a great telescope, we are very glid we live on the earth

### HOW THE TELESCOPE IS TURNED TO SCAN ANOTHER PORTION OF THE SEY

When all have seen the moon, the astron once suggests that Saturn might be next on once suggests that Saturn might be next on the program. But them might be next on the program But them as the saturn state of the saturn state and swings to one safe, as the saturn state of the saturn state and swings to one safe, as the saturn state of the satur

floor is too low the proper button must be pressed, so the floor will rise and carry us once more to the eye-end of the telescope

### SATURN WITH ITS BRIGHT RINGS AND ITS NINE MOONS

When all is ready, once more we take our turns The first to look exclaims, 'Why it looks just like the pictures!" and so it does Saturn is a lovely thing, poised delicately in the center of a set of rings that remind one of the brim of a hat We see no motion, yet the planet is turning much faster than the earth. The millions upon millions of tiny particles which compose the rings are also revolving swiftly around their planet, ever in their proper places, so the appearance of the rings is preserved. To either side, outside the rings small, starlike objects are seen they are some of the 'moons' of Saturn The planet has nine moons in all, but seldom are more than five or six visible at one time Some might be hidden in the shadow of the planet and some are exceedingly faint, to be seen well only on photographs

Then we look at guant Jippiter, with six deep belted atmosphere of ammonia and marsh gas Its strong markings enable us to see its rotation the markings more across in one direction those near one edge passing out of sight around the limb or edge of the disc while new ones come into view at the first of the six of the are easily visible they change their places as we watch them and one of them casts is shadow on the planet, to produce an eclipse of the sun. But there is no one there to see hadow on the planet, to produce an eclipse of the sun. But there is no one there to see the eclipse, for on lipster it is very cold and the derise atmosphere, made up of novinos press, part of statuble for anything that here

here on earth

So the evening passes As we langer we feel
that we are leaving further and farther for
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almost to inflinit, through space and time
Some of the objects we see—faint star clus
ters and nebula—are so distain that their
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Regretfully we take our leave more silent than when we came we walk the road down the bill, our minds filled with racing thoughts of creation and of worlds without end

# ASTRONOMY

THE ASTRONOMER'S

### By Marian Lockwood

Associate Curator, Hayden Planetarium

ONE of the most interesting and inspir ing of all stories is the long exciting and often beautiful tale of man's quest for knowledge Wisdom and knowledge are of many different kinds or branches and different kinds require different methods of approach The philosopher for instance does not use delicate and complicated instruments to help him to his conclusions. He could not even if he had the most perfectly accurate scales measure human thoughts and values by mechanical means. His material comes from his own reflections and those of others and perhaps largely from his own heart. The astronomer on the other hand starts with purely objective material with hard cold facts not with speculative data. Later after he has obtained his facts, he may speculate Theories are the result of speculation they are actually scientific guesses but they must be based on facts known and observed

It would seem that the astronomer has chosen for humself a hard job Most of the material with which he deals is so far away than he can not even seen it. The epiporer may travel out to visit the strange worlds he such cahace. The nearest of the worlds he studies the moon is on an average about 24,0000 miles from the earth. The nearest of the starts beyond the sun is nearly trent; sor trillon miles away and here our imagnation begins to failter of we have entered the celestal realm where distances are so vasit that very the start of the start of

Nevertheless the astronomer tells you with some confidence what the stars are like how large they are whether they are compara suely, but or zold, what they are made of how fast they are traveling and in which di rection. How does he know about these things? How can he possibly have learned so much and "o for ?"

The answer to these questions is simply that the story of astronom is the story of wonderfully recurate and delicate instruments which astronomers have desised in the last few hundred years. The story of astronomers have desised in the last few hundred years.



An old time astronomer gazing through his telescope

omy is also the story of light for it is only as we construct instruments to gather and analyze light the sole messenger which can come to us from outer space that we learn about the universe which stretches out in every direction like a vast and endless sea

In this vast sea of space which surrounds the earth anyone with good eyesight can see at night several thousand tiny points of light which we call stars. At one time the average person can probably see about 3 500 stars There are about 0 000 in the entire sky of which we see less than half at any one mo ment. But the stars which we can see with the naked eve are only a beginning We real ize now that in our own Milky II at Galari which is only one of perhaps billions of systems like it there are many billions of stars In order to see and study the celestial uni verse most of which lies beyond the range of naked-eye vision the astronomer has in vented ingenious and powerful instruments to bring the stars down to earth Let us see how he has gone about this problem

In 1668 nearly three and a half centures ago a Dutch maker of spectacles Jan Libpershey, constructed almost by accident a wonderful small instrument which made far objects seem closer, and dim objects clear file made this first refevency by placing two processing which has been been by placing two processing which has been been at distant houses and people. According to the story that is till it was just by accident that Lippershey happened to put the rubit two lenes to happened to put the rubit two lenes to ather He never did anything of importance with his little instrument, the first telescope

The word telescope is an interesting one—from the Greek word tele meaning far and scopen meaning "to watch. In other words a telescope is a far watcher exactly the right name for it.

## THE FIRST CRUDE TELYSCOPES OPENED NEW

In 1600 or 1610, a famous plu sicist in the city of Horence Galleo Gablei by name heard of Lippershey's discovery and set to work to make the himself a telescope which he could use in the study of astronomy. We are told that he used a piece of organ paper and two spectacle lenses. With this cru te in strument he peered at the sun and found dark six to on its brilliant surface, he by ked at Saturn and thought it a peculiar planet with ears or wings. His telescope was not good enough to show him that these ears are really rings around the planet Galileo observed the mountains and cristers on the moon and the four large moons or satellites of Jupiter which have ever since been called the Galilean satellites. His tele-

Galileo's telescope made a great enaction in bis day. I evole from fix and near flocked to have a look through it. John Malton the Finglish poet was one of Galileo's fixit instrument magnified objects three diameters. (A telescope's power to magnify is figured by diameters) Galileo later made a telescope with the power of eight diameters and then one that magnified.

scope was not strong enough to show him the

other moons of Jupiter

thirty diameters With Calibos invention of the astroporal call releccipe began a new era in astronomy call releccipe began a new era in astronomy of the hexens Sudienty the unwerser bad evanded, stretching out in all directions, and man found himself in presents on a magic arm long enough to bring down to mage arm long enough to bring down to heaven little! From that time on, for more than three centuries the astronomers man coordina has been to improve the instruments that help blin to see, to collect the faint light to analyze the secrets of the state see, and to analyze the secrets of the state, exe, and

There are two main types of telescopes the refracting telescope and the reflecting We have traveled a long distance from Gilleos tiny 'optik tube to the great forty inch the largest refractor in the world at Aerkes Observatory at Williams Bay, Wis

consin (This is the one described in A Visit to an Observatory.) And it is a long jump indeed from the small reflecting telescopes of Sir Isaac Newtona day to the gigantic 100 inch at Mount Palymar, California.

The refracting telescope is in its simplest form a tube with a lieu called the objective at one end and an expiner at the other end. The objective is a convex lens, that is a lieu that curves outward. The raws of light from a star or other land, strike the lens and are curried through it and come to a point mear the other end of the tube forming a image. The cyclice magnifies the limits The cyclic end of the tube forming and the control of the cyclic end of the tube forming and the cyclic end of the tube forming are the cyclic end of the tube forming a constitution of the cyclic end of the objective of the objective control of the objective objective of the objective of the objective ob

The eyepieces of a telescope are changeable being of different magnifications. High magnification can be used only when the teeing is good. What do we mean by "seeing"?

## THE ATMOSPHERE OFTEN DISTORTS THE IMAGE IN THE TELESCOPE

The earth is surrounded as everyone knows he an envelope of air-a misture of gases which we call the atmosphere You have seen what happens in the atmost bere when its different layers are variously heated If you lak ahead of you along a hot road in the summer you will sometimes see a shimmeting and wavering of the air just above the road. Or if you sit before a window under which there is a hot radiator you see the air above the radiator wavering and mov ing in the same way. This is due to the un equal heating of different layers of air When you look out to objects beyond through these layers the objects appear to be distorted The astronomer often notices this same effect in the atmosphere through which he must look to see the stars out beyond The uneven heating of different layers of air causes a shimmering or twinkling of the stars and other heavenly bodies which makes the "seeing' poor When there is a more equal heating of the air, higher magnifications can be used, but when the seeing is poor a high magnification magnifies the distortion So the amount of magnification which can be used depends upon the stillness of the atmosphere Astronomers sometimes think with longing of the moon as the ideal place for an

longing of the moon as the ideal place for an astronomical observatory, for there where there is no air, seeing would always be good. In the reflecting telescope the rays of light fall upon a concave mirror (one that curves inward) and are reflected from it to another.

murror and the image is reflected again this time to an eyepiece that magnifies the image Various types of reflecting telescopes are in use the most common being the Newtonian and the Cassegramian forms In the New tonian form the eyepiece is at the side of the tube near the top of the telescope and in the Cassegramian type the eyepiece is at the lower end of the instrument.

The largest reflecting telescope in use at the present time is the Hooker Telescope at Mount Wilson Observatory in Passidena Californa This reflector has a mirror 100 inches in diameter that is eight feet and four inches across The 200-inch reflector to be installed on Mount Palomar near San Diego will be finished before long and as Diego will be finished before long and in the second to the what it will reveal beyon the present known builts of the universe.

The telescope is the basic instrument of the astronomer It is used not only in actual observing but in combination with other in struments The main purpose of the tele scope is not as so many people erroneously believe to magnify though it does make things appear larger. The primary importance of this instrument is in collecting the light coming from distant objects objects which would be too faint for the astronomer to study without optical aid. The telescope gathers and intensifies light so that the as tronomer may study it by means of other instruments attached to the telescope. The resolving power of the telescope is ex-tremely important also That is objects which are so close that they appear to the eye as one are seen through the telescope to be senarate. The telescope is furthermore a

good pointer to indicate positions in the sky The Camera "Sees" much That is invisible to the human eye

The telescope in team work with the photographic camera forms one of the astronion mer smost important tools. The large telescopes are today used almost entirely in this way. The camera is attached to the seeing end of the telescope or where the eyepiece, would be 'N ifn' nice camera we can justice graph objects that could not possibly be observed through the telescope by the eye.

A very laint star for instance does not give suff cent I ght for the human eye to see And the longer the observer looks the less will he sees for the eye ter do to tree Put a camera in place of the eye however at the seeing end of the telescope and what do we have? In the camera is a photographic plate



The great 200-inch reflecting telescope at Mt. Palomar

covered with a sensitive emulsion which registers the presence of light however faunt During a long time-exposure the camera see does not become tirred as a human ever would. The little point of light which represents the distant star continues to shine upon the emulsion finally making an impression and recording its presence there. This point of light can then be studied by the astrono mer at lessure when the olates is developed.

Telescopes are fitted with driving clocks which keep them turning at such speed that the same stars are always centered in the feld of vew If the telescope d d not turn to compensate for the rotation of the earth and the apparent westward motion of the stars the images of the stars would appear as streaks of light moteral forms.

As the telescope and the camera together form a wonderful team for recording, the presence and movement of the heavenly bod ies. So much for collecting light. There are other extremely complicated instruments which are often used with the telescope and to break up are analyze the 1 ght which comes from the stars. But first we must un derstand the principle on which these instruments work.

In 1666 nearly three hundred years ag Sir Isaac Newton one of the greatest physicists of all time discovered a basic fact on which most of modern astronomy and astrophysics is foun led. By passing a ray of sunl ght through a prism Sir Isaac found out that sunlight or white I ght is composed of all the colors of the rainbow In other words white light is not plain white light but a mysture of light of different colors or differ ent wave-lengths

## THE WONDERFUL SECRET OF THE SPECTRUM WHICH NEWTON FOUND BUT COULD NOT USE

The hand of colors which we observe when be reak up wh it light its know as the spec trum. Red light which has the longest wave length of any light us ble to the human eye is at one end of the spectrum and work up to the spectrum of the spectrum and work of the discovered the key to one of the precise severts of the universe but he did not be spectral several of the universe but he did not be spectrum, it that the spectrum and the spectru

troscope but if we understand the basic principle upon which it works we shall see eas ly how it fits into the astronomer's work The modern spectroscope is an instrument into which I ght enters through a very nar row slit perhaps only a few thousandths of an inch in width The light then passes through a lens known as a collimating lens which straightens out the diverging rays of light and makes them parallel. These parallel rays of light from the sun or from any other hervenly body then pass through a prism which breaks up the light into the culors of which it is composed. This hand of colors the spectrum is focused by an objective and then studied through a small telescope at tached to the other end of the spectroscope

The spectrograph is this same type of instrument but adapted for photographic work. Other adaptations known as the spectroheloscape and the spectroheloscaph are used in observing the sun under special conductors. Whenever you see helio in a word you can be pretty sure that the word has something to do with the sun.

But now that we have the band of colors spread out before us how do we use the key that 'vexton discovered' We use it to learn what the universe is made of Each chemical element in the universe

Each chelinds relieved in the universe possesses a distinct fingerprint just as each individual person has a fingerprint different from those of every other person in the world By its distinct fingerprint an element can be recopiled and the expension of the earth or in the most remote star Each chemical elements.

recognized by its own distinct pattern of innes and colors in very definite places all ways the same in the spectrum. When we observe certain yellow lines in the first bar observe certain yellow lines in the first bar of the circumstance of the colors of the pattern of the spectrum of a distant star, we know that sod um is present in the body in incander our cities of the colors of the color

In this way by recognizing the spectral lines of any element we are able to identify the materials of which the stars are com posed or those which are present in the at mospheres of the planets We have identified in the sun more than sixty of the ninety two elements known. The gas helium was discovered on the sun twenty seven years before it was found on the earth-discovered of course through a peculiar pattern of lines which indicated in the solar spectrum the presence of an element not as yet known to man Later that same pattern of lines showed up when helium was discovered here The name helium comes from Helios the Greek name for the sun god If the star or other heavenly body which

is the source of the light being analyzed is moving away from the earth there is noticed in the spectrum a definite shift of the lines toward the red end If the body is approach ing the I nes shift toward the violet end The astronomer can tell by examining the spectrum how fast the star is moving

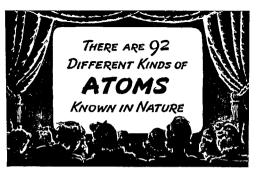
#### HOW WE MEASURE THE STARS AND TAKE THEIR TEMPERATURE

By other instruments the interferometer and the bolometer the astronomer can estimate the size and the temperature of stars and the temperature of stars. But in each case the all important thins? I ght the messenger of the universe with the stars and the universe who had the start and the universe and of our own constantly sending to us from all parts of the structure of the universe and of our own constantly sending in space. The stars are startly as the stars and the universe and of our own constantly some small and unimportant our earthly home; a small and unimportant our earthly home;

learned too how small and unimportant out earthly home is.

One thing not even our most del cate in struments can tell us as yet. Are there other planets other solar systems perhaps with living be ngs? I ossibly some day we shill have instruments that will tell us definitely

ves or no



## ATOMS AND ATOMIC ENERGY

By Thomas H Osgood

WHEN the first warm days of summer come, we all enjoy seeing flowers and vegetables growing in our gardens and fields They grow so fast that the difference in size can be noticed almost from day to day. They all started from tiny seeds so we naturally believe that most of the stuff in the fruits and leaves must have come out of the ground, or out of the air, or out of the rain, or out of the fertilizer which was used Later on we eat the vegetables-the tomatoes, the carrots, the corn and the beans By eating these and other things children grow heavier and taller, their bones grow stronger their hair grows longer So we must also believe that most of the stuff of which children and adults, are made must have been contained in the food they ate, or in the air they breathed, or in the water they drank If you think about this a little you will want to ask Are there the same ingredients in the soil. in the vegetables and in ourselves?

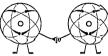
Men have sought the answer to this ques tion for centuries They have learned how to take the carrot to pieces, and the soil also scement has lately been made of the finding of add tional atoms. These pages tell of man made atoms

and wood and coal and sugar and salt and all other kinds of matter that we see around us They have found out what we are made of, also

Les, it is true that you will find some of the same ingredients in the soil the air, the rain, the carrots and other vegetables and ourselves Now here is a very wonderful thing Cut a carrot up, and keep cutting until you have the smallest possible piece of car rot, and you have a tiny, tiny piece of mat ter You have such a tiny piece of matter that you can not see it—you can not see it with any microscope, though you might see an enlarged image of it by the wonderful electron microscope

We call this tiny piece of anything a male cule, which means 'small piece' \ow a molecule itself, though it is so tiny, is made up of even timer parts. In most cases, how ever, the parts are not the same as the mat ter we started with The parts of a carrot

molecule are not carrot, for instance These parts that combine to form mole cules are called atoms. The molecules of some things (water, for instance) have just two kinds of atoms locked together Other materials have many different kinds of atoms. Some molecules are rather simple, others are complex, with hundreds of atoms of various kinds, combined according to rules of nature. We have not yet discovered all



How some atoms join together to form a molecule Each individuel of this tribe possesses only one arm

these rules, but we know some of them
New molecules are continually being discovered by chemists to add to the thousands
we already know But in all the world—and
in the sun the moon and the stars—there

we attendy know. But in all the world—out on the sun the moon and the strass—lines are only meetly two different knods of a wind on the sun that the sun

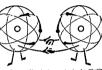
You can understand this if you think of a piano. There are only eighty eight leys, yet their sounds can be combined in count

yet their sounds can be combined in countless tunes

Now let us consider the ninety two different kinds of atoms. Some are very familiar
to us. Every day we see materials made of

contains atoms of only one hand, and therefore one of them is called an iron atom. The atoms of mercury in your mothers fever thermometer are all of one kind, they are mercury atoms Silver, gold and lead are each made of only one kind of atom, though we often mit them with other materials to make them stronger metals, called alloys, for daily use

When a substance is made up of atoms of one kind only it is called a chemical element Tamiliar chemical elements are iron, copper



Other stoms combine to form molecules by "double bond" as this union is called Each individual of this tribe possesses two arms

and alumnum which are metals ovyren, by drogen and belum, which are gases cat bon, sulphur and phosphorus which are sol ask but not metals, mercury is a loquid Some chemical elements can be told by their appearance, shlowing appearance alone is an interface to the control of the medium and the colors of the medium at control of the color of a chunk of copper is not due to any color of the midwidnyl copper at onso, but is



If you were making a cardboard village you sould arrange the buildings as you liked in order of value perhaps. Column 3, on the next page, arranges the atoms seconding to weight, putting hydrogen, the lightest, in first piace.

caused by the special way in which the atoms are not together to make the solid piece

As we have said there are only meety two known different kinds of atoms, or chemical elements. Every but of matter in the world is made up of some combination of these nunely two Although we say that they are all different, nevertheless some show a sort of family relationship. To understand this think first of the buildings in a village. They could be listed in order of size starting at

the smallest and ending with the largest \( \) number could be assigned to each starting with \( \) for the smallest and going on until all the buildings were numbered

Another number could also be put opposite each building on the list representing let us say the value of the building Usually but not always the value would be greater the larger the building And finally some descriptive term could be added to each entry on the list such as grazer shore or dwelling

## TABLE I THE ELEMENTS

Column 1 Column 2 Column 3	Name of elem Chemical sym or at breviatio Momic numb	bal n			Column 5 F	pprox mate orm when p gas M m	ure etal L	liquid	
Column 3	rionite numbe				,	non metal	, ,,,,		
Hydrogen	н	1	1	G	Silver	Ag	47	108	м
Helium	He	2	4	G	Cadmium	Cď	48	112	M
Lathium	Lı	3	ż	M	Indrum	In	49	115	3.1
Beryllium	Be	Ä	ò	M	Tin	Sn	50	110	M
Boron	В	5	ri	•	Antimony	Sb	51	122	١.
Carbon	č	õ	12	1	Tellurium	Te	52	128	•
Vitrogen	` `	Z	14	Ġ	Iod ne	1	5.3	127	· \
Oxygen	0	4	16	G	\enon	٦e	54	131	G
Fluorine	F	0	10	Ğ	Cesium	(.s	55	133	M
\ean	Ne	16	20	G	Barium	Ba	56	137	M
Sodium	\a	11	23	M	Lanthanum	l a	57	139	31
Magnesium	Me	12	24	31	Cenum	Ce	59	149	УÍ
Aluminum	ŭ"	13	27	M	Prascodymuum	Pr	59	141	Ni.
Silicon	si .	14	28	V	Neodymium	Nd	00	144	M
I hosphorus	P	15	31	N	Ill mum	11	61	7	M
Zajohar	Š	15	32	N	Samarium	Sm	h2	150	N
Chlorine	Č	17	35	Ġ	Furopium	Fu	61	152	M
Argon	Ă.	18	40	Ĝ	Cadohnium	čā	64	157	M
Lotassum	i	10	39	M	Terbium	Th	6.	159	ΝÎ
Calcum	Ĉa .	20	40	M	Dysprosium	Dv	66	162	N
Scandium	š.	21	45	Ni.	Holmium	Ho	67	164	vî.
Titanum	า้	22	45	vi	F rbsum	Γr	68	168	M
\anad um	ί'	23	51	N.	Thui um	Tm	to	100	vi
Chromium	Čr	24	53	Νí	Street rum	Yb	70	173	M
Manganese	Мn	75	55	M	Lutectum	Ιū	21	175	M
Iron	l e	26	56	M	Hafnium	H	72	120	M
Cobalt	Ĉ	27	50	M	Tantalum	7.4	73	181	M
Nickel	Ši	28	50	ΝÏ	Tungsten	ii.	74	184	Ní.
Copper	Cu	20	64	M	Rhenium	Re	75	186	M
Zior	Ž'n	30	65	M	Chenium	Os.	-6	192	31
Galbum	Ca	31	-0	11	Indium	Ir	-7	103	M
Cermanium	Ce	32	7.3	м	I latinum	l't	78	10)	31
Arsenic	Às	33	-5	١.	Gol i	Au	79	197	vi
Scienium	Se.	34	79	١.	Mercury	Hg	80	201	M
Bromine	Br	35	Fo	NL	Thallium	77	81	201	31
Krypton	År	30	84	٠,	I ead	I b	83	207	M
Rubidium	Rb	37	85	M	Besmuth	Bı	83	200	M
Strontium	Sr.	19	83	11	Polonium	Po	84	210	31
tittum	١.	70	89	31			85		
Airconium	Žt	40	oi.	M	Radon	Rn	6.6	223	G
Cotumt jum	Cp	41	93	M		_	8-		
Moly belenum	Mo	42	66	M	Radium	Ra.	83	226	M
Masurium	Ma	43	٠,	M	Actinium	Ac	89	27	M
Ruthenium	Ru	44	101	M	Thornum	Th	90	232	31
Rhed um	Rh	45	105	31	Proto-actinium	Fa.	93	331	31
Padadium.	14	10	10*	М	( rantum	ι	92	37.4	31



It would be a strange village if every eighth building were a garage with a courch next, the

When atoms are listed in this way Table I is obtained The first column of Table I tells the name of the atom hydrogen, or m trogen, or another The next column gives the usual abbreviation of the name, or its chemical symbol often the first two letters of its name in Latin Then follows a number, called the atomic number which ranks the atom in order of size, or weight Next the atomic weight of the atom is given, counting hydrogen as having weight I And finally a letter is given to tell whether the atom ordi narry joins with other identical atoms to form a metal, a non metal, a gas, or a liquid Thus we read Copper, Cu 29, 64, M-which tells that the chemical symbol for copper is Cu that it is 20th from being the lightest atom that a copper atom is 64 times as heavy as a hydrogen atom and that the material copper is a metal under ordinary con ditions So we see that the table gives a good picture of each element

We would think it a very strange village if every eighth building in the list starting with No 2 was a garage and every eighth building starting with No 3 was a drugstore, and every eighth

Lenon

building starting with No 4 was a residence, and every eighth building starting with No 5 was a bakery Yet this is just the kind of thing we find in the table of the various elements

When applied to atoms and chemical elements, this strange regular ity is known as the periodic law To make the meaning clearer, some of the atoms from Table I have been set down in crossed col umns to Table II, which is part of the Peri odic Table used by chemists Reading the atomic numbers across, you

have 2, 3, 4, 5 6, 7, 8, 9, 10, 11, 12, 13, 14 15, 16 17, 18, 19, 20, 21, 22, then some jumps then 33 to 40, then more jumps, then 51 to 56 The atomic numbers remember, tell the

way the elements rank in weight, beginning with the lightest, hydrogen Now read down, beginning with 2, Heli-

um 2 10-18, 3 11 19 4 12 20, 5 13 21, 6 14 22 7 15 8 16 0 17 The pattern is not perfect, but again and

again you see the atomic groupings themselves, eight atomic numbers apart

Is this just a matter of chance? No The atoms in the columns really are related Numbers 4, 12, 20, 38 and 56 (beryllium, magnesium, calcium, strontium and bari um) which fall into the same column have very similar properties. They are all metals, they look somewhat alike and they behave

very much alike, so much so that chemists often have diffi culty in telling havzor which is

from their be which

Again as a result of this grouping by eights, five elements, helium, neon, argon, krypton and xenon find them selves in one column These elements are all their gases

chemical behav

ior is identical, in

that they will not

## TABLE II PERIODIC TABLE

	-	4.4	***	1.	•	V.	VII
zHe Kelium	3Ľ1	4Be	5B	6C	77	80	9F
10 Ve Neon	11/2	ralig	1341	1451	421	16S	17C1
184 Argon	19K	20Ca	31°C	22T)			
					33 4s	34Se	35Br
36Kr Krypton	37Rb	39S1	38Y	40Zr			
					51Sb	52Te	stI

55Cs 56Ba



a house then a bank, then a school and so on The elements do show this sort of arrangement.

enter into chemical combination with any other elements. Thus they are called inert or noble, gases, because they stand about It is this nobility which makes helium so valued for airships and blimps. It can not combine with oxygen or with any other element to make an explosion.

A story of relationship can be told about

the elements in any other column of this Pe riodic Table Similar elements fall into the same column, but elements in one column say IV, are quite different from those in, say VII

Let us go back for a moment to Table I Jou will notice that spaces 85 and 87 ar empty These must be left unfilled for elements which have not yet been discovered like seats in a theater for which tickets have been sold, but which are not yet occupied No other element has any right to be put

The whole study of chemistry, part of the study of physics and some of astronomy are based on what you have just learned about these mnet; two elements. The next step is to see how they combine to form molecules, and so build up the other materials in our world.

Atoms do not combine helter-skelter, but according to struct rules, beautiful rules of harmony. We spoke earther of the eighty-eight piano hops 3 box can not make chost just by striking any notes together 3 ou must learn the rules. You must learn what notes can be sounded together to make beautiful new sound ratterns.

It is the same with combinations of atoms Some, as we have said, will not combine at all Those we call the noble, or mert gases Different atoms do not always combine one and one, but sometimes one and two or one and three, or two and three. This orderly and regular behavior is governed by a number called valence Different atoms have valence o, 1, 2, 3 or 4 You would not be far wrong in thinking of an atom as having books by which it could attach itself to other atoms There is one strict rule, however Every hook must be used. The number of hooks is the valence of the atom. The noble gases have valence o They do not combine with other atoms Magnesium has valence 2, chlorine 1 Therefore one atom of magnesium hooks on to 2 atoms of chlorine, leaving no hooks un used The compound is magnesium chloride, written MgCl,

Oxygen, however, also has valence 2, so one atom of magnesium can combine with one of oxygen, each atom using its two hooks like two children each holding both the other's hands. The compound is magnesium oxide, written MgO.

Turning once more to the Periodic Table we see that the atoms are classified also ac cording to valence. In column I all the elements have valence I in column II, the valence is 2. Other valence numbers are column III, 3, column IV, 4, column V, 3, column VI, 1, and of course column O, o Thus by looking at the Periodic Table carefully, one can predict how











The noble gases as they are called, will not combine with other elements, but stay aloof Relium 2006, argun tryping and regon are noble gases. Relium, the lightest of them, is the best gas to use in hallows. ~0^65~

different atoms will combine if they com bine at all For example Ca(2) and F(1) make calcium fluoride Cal, Na(1) and Cl(1) make sodium chloride \aCl which is the chemical name for common salt

A brick wall is made of bricks so is a pile of bricks dumped from a truck. The one is much neater and better looking than the other This difference in appearance depends on how the bricks are put together to make the wall or to make the rough pile. There are several kinds of atoms which can be put to gether in different ways for example carbon and selen um to take only two which are marked with V (for various) in Table I Car bon atoms to ned in one way make dia

monds in another way, they make graphite Both these substances are pure carbon but the atoms are put together in different ways Diamond is very hard, graphite is very soft

Selenium can be made when pure, in three forms (a) red crystals, (b) red but not crystalline and (c) gray metallic crystals Only the third variety conducts electricity at all well Different forms of pure chemical elements such as these are called allotropic modifications, or allotropes \ot all elements which occur in different allotropic forms are so indicated in Table I Many elements are so rare that they can not be obtained pure enough or in sufficient quantity to provide material for experiments

## LOOKING INSIDE THE ATOM



We have seen that the smallest possible piece of table salt a molecule of salt is made up of two even smaller bits of matter an atom of sodium (Na) and an atom of chlorine (CI) We write the combination

VaC1 Sodium is a metal Chlorine is a gas. Their atoms combine to form the gritty salt we

use every day How do they do it? Before we try to learn the answer to that question let us find out

what an atom is The word atom means uncuttable Some scientists of olden days thought an atom

could not be cut They thought it was a tiny tiny tiny bit of matter the smallest possible bit and that the bits were all alike in any one substance But we know now that an atom small as

it is really is made up of still smaller par ticles of matter and there are several differ ent kinds of particles. They are not thrown together helter skelter but arranged in a beautiful pattern Inside the atom there is constant change and motion

So now let us look into an atom of hydro gen It is the lightest element and a single hydrogen atom is the simplest kind of atom

In the center is a mass of substance called a nucleus Near it but not always in the same position is a much smaller bit of mat ter called an electron. The mass that makes the hydrogen atom s nucleus is called a proton

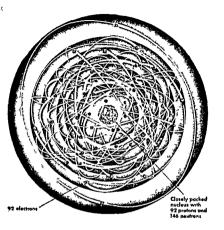
You know that there are two kinds of electricity which have the names positive and negative Now the proton of the hydrogen atom carries (or is charged with) positive electricity The electron carries negative electricity The proton is about 1 850 times as heavy as the electron but their electric charges are equal and opposite

Since the electric charges are equal and opposite, the atom as a whole has no electric charge - 1 + 1 = 0 This is true of every atom-its electrons are balanced in positive and negative electric charge

Now let us look into an atom of the next element helium with atomic number 2 We see a nucleus and 2 electrons. In the nucleus are 2 protons, which balance the electrons and the nucleus also has 2 other particles of about the mass of protons yet without any electric charge. They are neutrons. The mass of the electrons is so small as to be insignifi cant It is the nucleus by which we tell an

## URANIUM (192)

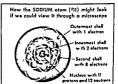
the heaviest atom known in nature



No see, over any as atom. Not were the most powerful microscope over made could bring within any sight to beinger and solvent atom houses in absort late of station. However, we will be a substantial of the station of the second of the second of a station that we will be a substantial to be substantial to the second of a station station based on what the accents in believe In the caster is the second of the second of the second of the second of the station of the second of t

How the POTASSIUM atom (419) might fook If we could view it through a microscope Outermost shell with on lone electron, though





atom's weight. We see by the table on page 45 that helium weighs four times as much as hydrogen-now we know why Hydrogen has 1 proton, helium his 2 protons and 2 neutrons

How about lithium the third element? A lithium atom has 3 electrons round about the nucleus In the nucleus are 3 protons to bal ance the 3 electrons in electric charge and 4 neutrons The lithium atom must be there fore seven times as heavy as the hydrogen atom and when we look at our table page 45, we see this is correct. The atomic weight is 7 Look at the table once more Column 3 gives the "atomic number" The atomic number is really the number of electrons (or the number of protons) the atom has Neon has 10 electrons and therefore 10 protons Its atomic weight is 20 so it must have 10 neutrons and that is correct

Down at the bottom of the list uranium the heaviest atom, has atomic number of Its weight is 238, therefore you can figure for

yourself the number of neutrons-146 The heavy atoms each have a swarm of electrons near the nucleus Lead for example has 82 As a result, the nucleus is very well protected from outside interference If you lived in a house surrounded with 82 traffic lanes, and your friends had to dodge cars on all those lanes every time they came to see you, you would probably not have many visitors Fortunately, the situation is not really so complicated, because the electrons near a nucleus obey very rigid traffic rules They stay in shells, we say, when we use the proper technical term. But you can think of them as circling in traffic lanes

In an atom the first lane nearest the nucleus, has room for only 2 electrons at any time The lane outside the first has room for 8, the one after that, 8 the next one 18, and so on until all the electrons are accounted for I or example potassium, with 19 electrons has them circling 2 in the first lane 8 in the second 8 in the third, and only 1 in the fourth although there is room in the fourth lane for 17 more

These traffic lanes or electron shells are not all equally spaced around the nucleus in the way that rings on a shooting target often are The actual distances do not mat ter very much to us, but it is important to know that the shell nearest to the nucleus is very close to it, and that the outermost shell which has only one electron in the case of potassium is very much farther out than any of the other shells Let in spite of all this complex structure, the diameter of the potassium atom, which means the diameter of the outermost electron shell, is only about one hundred nullionth of an inch If now we imagine that we have special microscopes and take a quick look at a potassium atom we would naturally see the most prominent part of it first, which would be the compara tively large shell in which the lone outermost electron was revolving We would notice some sort of tiny structures at the center of this shell but would probably not pay much attention to the details Actually it would contain the nucleus and the inner shells of electrons

If we took a quick glance at a sodium atom, we would notice one electron moving in the outermost shell, and, far inside the nucleus and two other tiny shells. The potas sium and sodium atoms both have one very large shell for the single outermost electron, and a central nucleus with other small shells of electrons round at The chemical nature of an atom is entirely governed by the outer most shell of electrons For sodium and po tassium these shells are identical. It is small wonder, then, that sodium and potassium are similar chemical elements and are therefore ~5°E>

put along with hydrogen in the first column of the Periodic Table where the valence is I (page 46)

The same sort of explanation can be given for atoms in other columns of the Periodic Table. The noble gases in column O are a rather special case. In all these atoms—helium neon argon etc—the outermost traffic lane or electron shell is full. There is no room for any more electrons. And when the shell is full it is just as though the atom.



built up a wall round itself and would have nothing to do with its neighbors. That is why the noble gases stand aloof and do not combine chemically with any other atoms.

he argon atom is like helium complete will not join with other atoms

Let us take a look, at magnesum The table of atoms tells that it is the twelfth lightest atom, and therefore has 12 electrons cruching round its nucleus. These are arranged in two full shells containing 2 and 8 electrons respectively with the remaining 2 electrons respectively with the remaining 2 electrons respectively with the remaining 2 electrons a positive charge of 12 and therefore con tains 12 protons. The atomic weight 18 24 so there should also be 12 neutrons in the nucleus.

It has been found however that the mass of the nucleus is not nearly so important as its charge. The nucleus of magnessium must have a charge of 12 but it need not have amass of 24. Suppose another neutron or even 2 were added to the nucleus. The charge of the nucleus would still be right for

# (D) (D)

Two MAGNESIUM atoms (\*12)

magnesium and the outside electrons could be arranged just as before Actually some magnesium atoms have nuclei constructed in this way giving them masses of 25 and 26 but keeping the positive charge at 12 Such alternative atoms are called isotones.

A piece of ordinary magnesum metal al mags has about 78 per cent of atoms with mass 24 11 per cent with mass 25 and the other 11 per cent with mass 26 We do not know exactly what determines these percent ages These sotopes are perfectly good mag nesum atoms Chem cal tests can not tell them apart an instrument called a mass

spectrograph is needed
You might think that a great number of
other isotopes of magnesium might exist. But
they do not There is actually one other of
mass 27 (12 protons 15 neutrons) but no
sooner do physicists put it together than it
falls apart again It is unstable or rad out
tree by so Gen stable isotopes exist we
will be so Gen stable isotopes exist
more about protons and neutrons we may be
able to answer the question.

Most elements consist of several isotopes. There is even a kind of hydrogen atom with mass 2 called heavy hydrogen but it is very rare. Tin has as many isotopes as any element. It has no all of course of atom c number 50 and ranging in atomic weight

from 112 to 124

Uranuum has several isotopes The most famous is uranium 235 Men have found how to split uranium 235 in two and through

this operation they learned to make the fear ful atomic bomb. We tell you more about this on page 53 under Atomic Energy. We now have a picture of a typical atom.

—a nucleus surrounded by shells of electrons with the electrons circling continuously All but the outermost shell have their



~5°/25~\_

full share of electrons. However once in a while this beautiful regular arrangement is disturbed. If some outside influence such as a free rowing electron comes along it may knock one of the outermost electrons of the atom slightly out of its regular orbin or traffic lane. The free rowing electron will get quickly out of the way like a hat and run automobile driver. The atom will be left a little different from normal However very soon the electron which has been slightly displaced will numb back to its former blace.

When this happens the atom gives out light The light from one atom would be far too faint for our eyes to see but when mil lions of atoms behave in the same way at the same time the light can be very bright. This is exactly what happens in a neon sign Roving electrons sent by electricity scurry through the neon gas in the tube and disturb numbers of atoms. When these atoms return to normal which they do in a small fraction of a second the familiar red light is given out Because all the atoms are of the same kind and behaving in about the same way the neon light is the same color-red Every kind of atom gives out its own special kinds of light forming what is known as its spec trum. In this way atoms can be identified by

their light In the above paragraph we have learned how an atom gives out light while returning to its normal condition after one of its outer most electrons has been al ghtly disarranged by some gentle disturbance However an atom may be disturbed very violently for example by electrons moving at extremely high speeds Such high speed electrons occur naturally as a consequence of the cosmic rays which beat upon the earth from outer space They can also be produced artificially An \ ray tube sends a stream of electrons moving at speeds between 50 000 and 180 000 miles per second When one of these electrons strikes an atom (for example in the metal target in the \ ray tube) it is likely to dislodge an electron from the atom and will most likely dislodge it not from the outer shell but from one of the innermost shells Now these shells are known by special

names The one nearest the nucleus is called the K shell the next one the L shell the next the M Suppose one electron has been knocked out of the K shell The disturbance has been so violent that the electron is likely to be removed entirely from the neighbor houd of the atom What is left is of course an ordinary atom with one electron missing from the K shell

This absence of one electron gives the atom considered as a whole a positive charge of electricity. The atom can not re main long in this incomplete condition any more than a good nouseholder will allow a broken window to go unreparted for a long-broken window to go under the Labell jumps into the habell to plug the vacancy and then in turn one from the M shell goes over to fill the space in the Labell jumps.

When these electron jumps occur the atom gives out \ \text{Tays which are really a kind of light only with a very much shorter wave-length than ordinary light. Thus we see that the formation of that kind of light which we call \text{V any is not very much differ ent from the production of visible light as we described it in the case of the neon sign \text{V asy so occur when an electron makes a jump from one to another of the inner shells of months of the shorter of the light is given out when an electron makes very small jump in the electron makes.

But we have left the atom after rearrang ing its electrons in an incomplete state with one electron missing from its outermost shell. How does it acquire an electron to complete its structure again? At all times there are always free electrons drifting around in a metal and even a few in the air The atom and the state of the continuous affectly normal resistance just as the good householder who has the broken window reconstitution.

## ENERGY FROM ATOMS

By Gerald Holton

Y OU have learned that all matter is made up of tiny particles called molecules A rod of iron for instance is composed of iron molecules just as truly, as a brick wall is built up with individual bricks. And you have learned that each separate molecule is com posed of one or more atoms of which there evist in nature only ninet; two separate kinds On page 45 is a list of all these different atoms starting with the lightest hydrogen and ending with uranium the heaviest and biggest. If a substance is made up of

atoms of only one kind we call it an element.
Let us look once more at the I ghtest element, hydrogen Each of its atoms consists of the off effecting the control of the co

Helum the next heaviest atom is made of three different particles At the center the nucleus there are two protons and two other particles called neutrons and circling around these four are two electrons. The neutrons are about as heavy as the protons but have no electric charge.

The th rd listed atom has 3 electrons and 3 protons the fourth element has 4 electrons and 4 protons and so on down the list until we get to the last element uranium which has 92 electrons circulating around a nucleus that contains 92 protons and 146 neutrons

## MATURE ALWAYS MIXES THE ISOTOPES OF AN ELEMENT IN THE SAME PROPORTION

Thus we find in general that each separate natural atom has as many (negatively charged) electrons outside the nucleus as these are (positively charged) protons in side. The number of neutrons in the nucleus is not so fixed for instance not all uranium atoms have 146 neutrons some have only 143 Others only 142. Thus we find in nature three kinds or isotopes of uranium but the fixed is much more abundant than the other fixed is much more abundant than the other.

Now there are two remarkable facts about isotopes. The first is that nature always mixes the isotopes of an element in the same proportions If you took an ounce of ordi nary uran um ore from anywhere in the world you would find that most of it con sists of atoms with a nucleus of 146 neutrons and 92 protons thus having 238 units of weight since protons and neutrons weigh the same and since the electrons outs de the nucleus are so I ght as to be almost negli g ble We call this kind of uranium U 238 But mixed with the U 238 in a lump of natu ral uranium are some of the isotopes weigh ing 235 and 234 units (one has three neu trons less than U 238 the other has four neutrons less) The isotopes are always mixed in these proportions 99 3 per cent of U 238 07 per cent of U 235 and about 0 006 per cent of U 234 These isotopes of the same element are difficult to senarate from each other in the laboratory because they are all alke in their chemical activities. Another interesting property of isotopes of arous elements is that their nuclea are not equally stable. In some isotopes when left all to themselves the atoms by and by all fall apart emitting (shooting out), some of their particles at great speed. Such isotopes are called radioactive Others do not readly it's integrate (fall apart) by themselves but easily however from the outside. You can learn about these interesting matters in the chapter on Radioactivity.

Whenever an atom disnitegrates into smaller pieces some of the matter of which the micleus consists disappears completely and is converted into pine energy. The amount of energy resulting from sold in the same control of energy resulting from sold in the same control which is responsible for the suns radiation and for the power of the atomic bomb. If it were possible to convert one pound of any matter entirely into electrical energy you could run with at all electrical energy with the properties about the billion kilowatt hours.

This method of creating atomic energy by destroying matter in an atomic nucleus of fers radically from the usual process of obtaining heat energy by burning or combus ton which involves only a rearrangement of whole atoms and their electrons with respect to each other.

We can now make a picture of the produc tion of atomic energy A lump of matter say uranium consists of uranium atoms of three kinds namely U 238 U 235 and U 234 Their nuclei cons st of 92 protons plus 146 143 or 142 neutrons respectively The nuclei of these various atoms are distributed through the total lump I ke a cloud of stars in the sky 93 even smaller electrons make large and rapid circles around each nucleus Though every uranium atom has a tendency to be radioactive it would take billions of years before half the atoms in any small lump found in nature would disintegrate by itself. Therefore we can assume here that our lump is fairly stable if left to itself

### BOMBARDING AN ATOM WITH NEUTRONS IS THE WAY TO SMASH THE NUCLEUS ITSELF

Let us shoot into this cloud of atoms a very small particle say a proton It is about 1850 times heaver than an electron and like the nuclei of the atoms themselves it is charged positively and as you know post tive charges repel other positive charges repel other positive charges.

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Therefore this proton will be repelled from uncle it may approach, and be turned aside, perhaps knocking a few electrons out of their regular path, as it goes by, until it has exhausted all its energy and is slowed down Hardly, ever will the proton have a chance to collide with a nucleus.

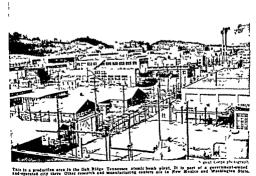
But if, instead of a charged proton, we fire an uncharged neutron mot be atomic cloud, it is not repelled by a nucleus that may be in its path, and a 'head-on' collision is possible While, therefore protons and other charged particles can knock only chips off the 'surface' of an atom, the neutron can get right inside and knock the nucleus itself anart. This is called fission.

This is the secret of atomic energy A neutron shot into a nucleus can smash the atom so that part of its mass is converted into pure energy and the remainder forms new atoms If a neutron having a little energy is fired into a lump that is mostly U-235, the following amazing thing happens. The first following amazing this part of the first fir

form another lighter atom. Several neutrons that were locked in the old U 335 nucleus have no place in these nuclei of the new atoms, they are free to shoot through the atoms, they are free to shoot through the rest of the atom cloud around them. They are so that around the theory of the atom choud around them. They set so about one tenth of one per cent of the mass of the old warning atom has been converted into pure energy which shows up in the ereat speed of these thing cartiels.

This explosion would not be noticeable by us if only one atom were set off. But you can see readily that the several neutrons that fix around after fission of their mother atom may similarly set off other explosions all around them, this "chain reaction actually occurs in a lump of U 255 as used in one kind of the atomic bomb Within an in billions of atomic bomb Within and in billions of atoms in the bomb are thus: ye intel "The total effect of this sudden re lease of enormous energy is an atomic explosion equalling in effect many thousand times that of the ordinary explosion of an equal lump of guipowder or TAT.

As far as we know now, this powerful "chain reaction" occurs only in U 235 and



d-operated city there Other research and manufact





An exposed photographic plate shows veins of pitch blende (bottom) which run in natural rock (too)

in one other element called plutonium which has to be produced artificially. This is the way plutonium is made. Ordinary uranium ore, as found in certain portions of the United States northern Canada Czecho slovakia and the Belgian Congo and con taining all three isotopes is assembled in one big pile weighing several tons. The U 235 naturally present in the pile will produce the chain reaction we have discussed above but at a slow rather than an explosive rate because many of the neutrons produced by fis sion of U 235 are swallowed up by the U 238 without causing any fission there This keeps the atomic fire in the pile smoldering rather than breaking out into a big blaze

Actually the fire would go out altogether if two tricks were not used. One is to insert within the pile some material like graphite blocks. Their function is to slow down the neutrons from the U 215 fission Why slow them down? Well it is a curious fact that these slowed-down neutrons are more ef fective in breaking up nuclei than are the high speed neutrons produced by fission The other trick used to keep the chain reaction going in the pile is to build it so large that only relatively few neutrons from the inside can reach the edge of the pile and escape without having hit and produced fis sion in some other atoms of U 235 or at least having hit and become absorbed by some atoms of U 238 That is called the critical size of the pile In a pile below

critical size so large a portion of the neutrons escape into the air before acting that the atomic fire will go out

In such a pile kept well supplied with fast flying neutrons by the chain reaction of the U 35 isotope the U 38 atoms may capture neutrons without their nuclei fall ing apart. But then a curious thing happens to such a U 238 atom The captured neutron which makes the atom now weigh 230 units by and by seems to split inside the nucleus into a proton and an electron. The tiny electron is violently pushed out of the nucleus But now the nucleus has 93 protons instead of the usual 92 of uranium Not long after that the same thing happens again in the nucleus (as tho igh one tickle made the atom sneeze twice )-another neutron in the atom splits into a proton and an electron and the electron flies out leaving 04 protons and 145 neutrons in the nucleus. This atom can of course no longer be considered uranium it is called plutonium It happens to act very similarly to U 235 If it is separated from the other materials in the pile that produces it and assembled into an atomic bomb like U 235 it too explodes with terrific violence by a chain reaction which spreads through the whole bomb material instantaneously

#### PLUTONIUM CAN BE SEPARATED AND CONCES TRATED MUCH MORE RASILY THAN U-215

You may wonder why anyone went to all the bother of producing plutonium (written as Pu 230) for atomic explosions when it can do no more than the natural U 235 can do The answer is twofold First it is very diffi cult to separate the isotope U 235 from U 238 since they are chemically alike but plutonium is an element chemically different from uranium and can therefore be separated and concentrated with greater ease And secondly as we have noticed before the amount of the U 235 isotope in a lump of natural uranium ore is very small compared to the amount of U 138 So it is more economical to convert the U 238 into plutonium than to extract the rare U 235 and discard the 140 times more abundant isotope U 238

Just as a pile for making plutonium will not begin to work until it has been built up to a critical mass or bigger so too a bomb made of U 235 or plutonium will not explode if its mass is below a critical size. This fact suggested an ingenious way of detonating (setting off) the bomb namely, by suddenly joining small pieces of the explosive material (U 235 or Pu 230) each below the critical size but more than sufficient in size when put together to spread the destructive chain reaction through the whole bomb For L 235 this critical size is probably a lump of less than 200 nounds mass

Are there any uses for atomic energy be sides the destructive ones? Luckily the an swer is yes. Famous scientists have predicted that not many years after man's first use of atomic energy in the form of bombs we shall have atomic power plants and atomic

engines At frst we might just make use of the

enormous quantities of heat that are liber ated in the uranium and graphite pile during production of phitonium Actually about one million kilowatts of power can be expected from one such pile which is not far from the amount of power developed by a large size electric power plant. Of course, some kind of heat engine would be used to transform the heat energy in the pile into electricity or use

ful work Later on perhaps in fifty years wavs may be found to use atom c energy liberated in a gasoline fuel is now being used in combus tion engines But before this can become pos sible a great deal of progress in physics and engineering will have to be made. But there are other more immediate results of the re search on atomic energy We have learned a great deal about the nucleus and its be havior which may open up new and better ways of using ordinary power generation Much has been discovered about new radio active materials and their effects in human bodies and in chemical reactions this bene fits greatly the fields of medicine biology and chemistry

What about the supply of fuel atomic energy? Must we depend on ura nium? We know that fission of single atoms can occur in several different elements but the production of larger quantities of atomic energy depends on a self maintained chain reaction of the material used as fuel so far only uranium and uranium produced plutonium have shown this chain reaction let the known deposits of uran um could supply the total world needs of power for

only a few scores of years!

Therefore we shall have to find other ways of generating atomic energy-for instance to try to induce chain reactions in more plenti ful and available elements such as some of the metals Actually it is just such a process involving the nuclear interaction of carbon hydrogen n trogen and oxygen which pro duces the enormous energies radiated by our sun and by other stars. Part at least of the





This p cture was made three minutes at cr as atomic bomb hit the Japanese city of Ragusaki on August 8. The huge smake column towe ed more than 20,000 feet in the ar On the ground the blast reduced the city to dest-

beat in the interior of the earth which prevents its cooling and complete freezing over is also thought to be atomic energy liberated by rad oactive elements

by rad oactive elements

A third process in nature involving the kind of atomic fire that results from the de struction of nucle is the spectacular explosion of stars which happens now and then A whole star seems to become suddenly a big

atomic bomb and vaporizes part of its mass suddenly into I ght and heat

It may have been such a celestial explosion which guided the shepherds to the crib of the Prince of Peace the child Jesus in Bethlehem May we all succeed in makow, this new powerful tool of producing atomic energy a means of spreading peace and

plenty to all men

# **AUSTRALIA**

## By Lloyd Clarke

BY far the most important event in the Australian calendar of 1945 was the coming of peace to the Pacific. And in Australia as in other countries, men and women turned their thoughts and their energies to the task of building a new pattern of living after almost six years of littler war.

The year had seen rapud changes and advances for the Australians sho were fighting the Japanese. The new year first trought news of a new Australian offensile its pur pose was to clear out the tot, 200 Japanese trapped in strongly defended pockets in West (northern New Gounca) and in the fit lands to New Britain New Teritod and Bour alliands (Solomons). These Japanese faces had been by passed in 1031 44 when General Dauglass MacAthur began the syectaculas enters of through the through the distribution of the fitting that the state of through the MacAthur began the syectaculas enters of through the fitting that carries of through the fitting that carries of through the fit to the fitting that the state of through the fitting that carries of the fitting that carries of the fitting that the fitting that

tor, in the Philymore The by passed Japanese thopy were no service the the Allies I ness of communication but there were many good reviews why they had to be eliminated. Australia felt also that she had an obligation to clear the Japanese from lands which rightly belonged to a friendly native receiber.

Consequently, the year becan with four crack divisions of Australian troops reased in a new campusen which I tought if alting as bitter as any hey had yet encountered to many. Ill interned peryle this strengtle that was wared for right weary months left e peace brought an end to hovell the was proved, a "morting left of the way for the peace to the peace



dependent for a throughpraneous. The Eabs of Glomportes terror a figuresis of the broken Einst Windowski.



Australians are famous fighters, A mortar crew in action with the enemy at close range Ballapapan Borate

tropic jurgle so perfectly suited to defense the battle to clear out the Japanese remnant became a costly inner war —a war inside the ever widering circle that marked our progress toward the final goal—Tokyo In New Guinea New Britain and the Solomons enemy casualities for the eight months were them in ferce hand to hand clashes in which the Australiums lost one soldier to every four tern Japanese.

Austral a s part in the war to defeat Japan was not limited to fighting the inner war Australian a rmen and sailors were in the forefront of the Battle for the Phil poines On May 1 came news that battle-seasoned Australian troops had stormed ashore on the oil rich island of Tarakan off the coast of northeast Borneo This sudden and unex pected thrust drove right at the heart of Ja pan's criminally gained empire of conquest This attack was quickly followed by an invasion of the Borneo mainland From the east and the west Australian soldiers hemmed in the enemy and caused him to flee to the north to the south and to the inland hills where Royal Austral an Air Force bombers and fighters strafed him mercilessly Al though the Japanese fought stubbornly in Borneo the fiery fanaticism that had marked

their earlier campa gns was dving A few

weeks before the Japanese surrendered the Australian commander Lieutenant General Sir Leshe Vlorehead was able to announce that all the first objectives of the Borneo campaign had been secured While men were fighting setting the stage

for the final defeat of Japan other men at San Francisco were setting the stage for peace Australia was represented among the hity nations which met there in conference to draw up the security charter Australia's delegation was led by Deputy Prime Minister Francis Forde and External Affairs Min ister Dr Herbert V Evatt They made two important contributions to the debate. The first was their leadership of a bitter opposi tion to the veto powers which the United States Britain Russia China and France sought to impose So ably was the Australian case presented by Doctor Evatt that he became known as the leader of the I ttle 45 as distinct from the well known Big Five the powerful countries which might other wise have unduly swayed proceedings. Aus tral as second contribution one which was finally adopted concerned the embodiment in the charter of the principles of full em ployment Long before the San Francisco Conference the Australian Government had committed itself to a policy of full employ ment This proposes simply that each na

tion should take upon its own shoulders the task of insuring that its own natural resources shall be developed to the full. By doing this, it is believed that employment will be provided for all living standards will be unproved and a fuller enjoyment of life made possible for everyone. In short it was Aus trails as plan to ach eve the second of the far mous freedoms outlined in the Atlantic Charter—freedom from want.

And so with this pol cy as her guide Australia began to prepare for the difficult per nod that must follow the change-over from war to peace. The National Works Council amounced its plan to provide 4 000 separate post war projects. These will put the governments policy of full employment into elforts of the projects was a scheme for the unification to standard gauge of the entre Australian railroad system ferhaps it would be stallan railroad system ferhaps it would be

a good idea to explain just what that means You know that Australia is a vast island continent whose land area is just a litle less than that of the United States. This buge land area is divided into six states each of which has an electred l'arisiment to adomister its domestic affairs. In the early days of railways, communities were small and scattered and there were no companies prepared to put suff cent capital in so ricky a venture as a railroad. So each state government un dettook the task of constructine its own. railroads. When each state had completed its system New South Wales and Western Aus tralia bad gauges (width between rails) of 4 feet 81/2 inches Victoria had 5 feet 3 inch es and Queensland had 3 feet 6 inches South Australia which I es between Victoria and Western Australia had both 5 feet 3 inch and 4 feet 81/2 inch gauges. These varia tions in gauges have caused great expense and loss of time because goods have to be changed from train to train at most state borders And so the National Works Coun cil a body on which each of the six state government leaders has a place has now de cided to proceed immediately with the colossal task of unilying the gauges to a feet 81/2 inches The preliminary steps alone are expected to take eleven years to complete and will cost at least \$ 47,000,000

Four events of pol tical s gn ficance oc curred during 1945 in Australia. The first of these was the arrival of the Duke of Gloucester brother of king George VI to take up duties as governor-general of Australia. The second was the trage death of Australia. The second was the trage death of Australia as greatly lowed wattine prime minister. John Curtin The third was the election of Joseph Benedict Chiffey as prime minister. The fourth was the announcement of the Justical ian Government's extensively planned immigration policy.

In record ng the Duke of Gloucester's ar rival as governor-general it might be well to



explain what his functions are and how Aus traba stands in relation to the British Crown The Governor General of Australia is George VI a direct representative in Australia It is not always easy to understand just what re sponsibility that involves. Australia is a free and independent member of the British Commonwealth of Nations Perhaps the best narallel to the kings position is that of the president of many companies each of which is independent of the other When he sits as president of any one company he is guided by the to ce of the shareholders in that con cern So it is with the King Although he is the president of both England and Aus tral a when matters concerning Australia are before him he must be guided by the voice of his Australian ministers to law passed by the Parliament of Britain can have any authority over the people of Australia That is why a governor general does not govern but becomes the personal representative of the king in the councils of the Australian people

The late prime minister John Curtin was a widely respected and beloved leader He directed the complete war mobilization which won Australia such remova among the nations of the world He died quietly in his sleep on July 4 at the prime minister s ofti call Canberra residence H s death followed a general illness which had persisted since November of the previous year One of the first people nothfield of his death was Press.



Ans ral an News and Informat on Bureau John Curtin (loft) and Joseph Benefict Chifey

dent Harry Truman President Trumans to comment on his passing was He brought to the public service of his country not only a great ability and integrity but a deep sense of loyalty to the principles which guided the United Nations through the war so victori only ended in Europe and so successfully make the property of the property o

#### AUSTRALIA'S NEW PRIME MINISTER JOSEPH BENEDICT CHIPLEY

John Curtin was followed in office by Joseph Chifley who was elected leader of the Federal Parliamentary Labor party the Government party on July 12 1945 His ele vation to the post of prime minister climaxed nine of the most incident packed days in Australian parliamentary history for in that time Australia had three prime ministers-Deputy Prime Minister Francis Forde who acted in office until a new party leader was selected and finally Joseph Chifles Chifles who was Federal Treas urer in Curtin's Cabinet began life as an apprentice in the New South Wales state railroad service and had risen to locomotive driver when he left the footplates for politics

One of the first appointments made in the new government was that of a Minister for Immigration The newly appointed minister Arthur Augustus Calwell who is also Minis ter for Information followed his appoint ment with an important announcement about Australia s immigration plans. He con firmed the Government's intention to raise the populat on from 7 300 000 to 20 000 000 by the swiftest possible means. He added however that the Government will not em bark on any large scale immigration program until its own house has been set en tirely in order By this he meant that when the Austral ans in the services and those who had gone to other forms of essential war work were once again settled in normal liv ing the door would be opened for others to

come in

The Government is looking to Europe and
the United States for the bulk of its infinigrants and has permitted bunderds of American and British servore men and women to
take their discharges there. First step in the
plain will be to bring out 5,6 coo British war
orphans who will be schooled and trained for
work and living in Australia. They will be
taken to Australia, at the rate of 17,000 a



By John Paul Andrews, Executing Editor, Air Yews Magazine

SOME day we shall fly peacefully on the power that destroyed Hiroshma and Nagasaki But that day is almost certainly a long way off For one thing atomic energy is not likely to be used in existing airplanes and airplane engines designed as they are for more commonplace methods of propul ston And as you know scientists inventors and engineers have a long way to go before this energy can heat our homes fly our planes or power our automobiles.

So let us consider the airplanes which are already flying and not so much those of an age to come It is the planes that are in the air and in the factory now that we shall know in the next few years. It is these planes that will be the victors over time cost and tanger in opening a new era of mass world

cuching transportation. It is interesting to look back a lew years in order to obtain a true picture of aviation's advance. Before Pearl Harbor the twin engined Douglas DC 3 and the Lockheed Lodestar transport phanes—just about all of aviation to the common observed—travelle through the air at speeds of about 173 miles and bour Art battles, however are won and an abour Art battles, however are won and

lost in maintes not hours So ill the fighting nations designed and built military planes for more speed and then still more Fingnes were improved made bigger improved again Designs became aerodynamically more efficient planes were cleaner (resistance to wind decreased) and smoothers so that all of them slid through the air with an ease undreamed of usit five years before

The 300-mile an hour mark flashed by then the 350-mile-per hour speed Finally at the war s end. All ed fighter pilots were flying and fighting at over 425 miles per hour in planes such as the Republic P 47 Thunder bolt the North American P 51 Mustang and the British Hawker Typhoon The big fel lows went right along with their smaller brothers Boeing Aircraft Company engineers developed the Boeing Stratocruiser from her wartime twin the B 20 Superfortress The Martin B 26 Marauder gave rise to its trans port relative, the Martin 202 The Douglas C 54 Skymaster became the commercial DC-4 and had a new sister in the fifty-six passenger DC-6 Lockheed s C 60 Constella tion replaced cargo space with seats and made ready for the eager onrush of travel



Stheduled for overseas and domestic use by Trens Canada Air Lines this forty passenger air liner is a version of the C 54 Skymaster military transport

hungry passengers All these planes fly faster, farther and more economically by far than their pie war ancestors And they are flying now. The greater things ahead are unpredictable Why even now a plane with wings longer than an entire football field is being built. It is the Hughes Hercules, a mammoth wooden flying boat, capable of carrying 300 passengers or transporting as cargo Glenn L. Maxim s high plane, the Marsi.

Progress in air speeds went so far, and then it came to a temporary halt Propelers could absorb no more power even though engines had grown to twice their pre war size. Until planes without propellers were designed avation was held at about the 500mile-per hour level. Then came jet planes, which were boult to fly without propellers.

All of us are iamular with skytockes Military rockets have been in existence for a long time Francis Scott Key wrote of "the rockets" red glare 'in 1814, But man carrying rockets had never been attempted until Dr Robert H. Goddard began experiments in 1330, at almost the same time as the an nouncement of Baron Fritz von Opel's rocket powered airplane in Germany Rock of the Control of the Contr

Scentists and engineers learned how to draw ar into the nose of an airplane or automobile, heat this air to increase its pressure, then release it through the rear end of the vehicle. Here was a means of making planes move along at tremendous speeds. Inventors also learned that speed increases as a plane climbs higher and higher above the earlier should be also the properties of the prop

where the air is less dense and offers less resistance to the movement of any object. To understand the principle of jet propul

sion, one needs only to puncture a toy had toon with a pin As the air is released through the tiny hole, the balloon moves rapidly in a direction opposite to the pinhole. The speed at which it moves depends upon the pressure of the air within the balloon itself before the hole is made the higher the pressure, the greater the speed And, for a given to the pinhole of the pinhole o

It was this demand for tremendous heat which first handicapped the jet plane engi neers. To build the fans which force the hot gases out the rear of the plane an unusual metal was needed. It had to withstand ter rific temperatures, produced by burning ker osene-the common jet fuel Here American engineers took over the projects which had begun in England Using turbines, or large blowers, originally developed as supercharg ers for Flying Fortress engines, the engineers greatly increased the efficiency of Great Brit am s Whittle jet engine. The result was the first American jet airplane, built by the Bell Aircraft Corporation and known to the United States Army Air Forces as the P-59 Airacomet From the lessons learned with this airplane a newer and better type was developed, the Lockheed P 80 Shooting Star It was the first American plane to approach the speed of sound

#### PLANES WHICH TRAVEL AS FAST AS SOUND HAVE LONG BEEN THE GOAL OF ENGINEERS

Sound, as you know, travels about 750 miles per hour The speed of sound, known as some speed, has always been the goal of most aviation engineers. The jet plane most nearly approaches this speed now and, with further refinement, may some dry lead to the desired roal.

In 1944 a jet airplane flew from Los Angeles to San Diego, a distance of about 135 miles, in just over teethe minutes That 135 miles, in just over teethe minutes That an hour. Late alignment of the processing the properties of the processing the processing the processing the processing the same from New York to San Transcisco of iron. Quebec is Vancouver may become onto the customary way to travel before control me customary way to travel before officed in the morning and airwing in Los Octobes in the morning and airwing in Los

Angeles at eight fifty nine the same morning. But pet propulsion is hardly more advanced than regular enguies were when the Wright brothers made their first flight. We have only indications of what we shall accept as a regular thing five or ten years hence Vost aircraft engineers now picture. I soo mile per hour speeds as commonplace within ten years the period of the period of

## and dinner, or around the world in less than a day THE AVERAGE PRIVATE OWNER WILL NOT HAVE A RELICORTRY FOR SOME TIME

The straight up-and-down auphane known as the helvogher u another mixacle of progress It has been said that every amphane in ventor from Leonardo da Vunc to the present has tried to perfect this type plane Recent years, however have seen the first measurable success in the helicopter field Able to rise directly upward to descend from any altitude into a space little larger than the average lawn to hove or stand all most still in the air for long periods of time the helicopter is as everstile as a bird. Heli and the average lawn to hove or stand all most still in the air for long periods of time the helicopter is as everstile as a bird. Heli and the average lawn to hove the standard with the standard progression of amortis because any small clearure will were them safe haven

Unfortunately helicopters are still very expensive. They carry only a few people and are somewhat slower than low-cost standard planes. They are at the same time difficult to master Flot training for a helicopter lasts planes can be flown stelly after less than to hours of instruction. The helicopter will appear this year or next year on commercial operations carrying mail or farm produce to temote areas and moving cargo from cities to suburbs. However, it will not become duction brings how prices.

offiction brings low prices
The private or personal airplane now
Tanks as the most important term in our
avatation industry suture Costing little more
than a medium priced automobile these
planear will carry two peed seeding to
miles per hours and over distances of soo
miles per hours and over distances of soo
miles and more without re fueling They will
use less gasoline and off than a small automobile and will be expense only in fixed
chatges like insurance and storage Several
types have been introduced which are driven

like automobiles and are just as safe. It will be many years before every family owns an airplane but some 350 000 people will own their own planes within the next three years. During the war airplanes were designed

to land and take off in as small a space as possible. This improvement will make a great change in many new airports. Some of them can be very small and still be practical and useful.

Prior to 1041 fewer than too American cities had airports large enough to take ad vantage of air line travel. But with more and more communities adding landing facilities and with aircraft advances that permit smaller areas for landing and take-off regu lat ait service will become available to over 2 000 towns and cities in the United States Canada too and Mexico are advancing to establish a vast network of North American airports Most of these will be simple clear ings on the outskirts of towns. Many will be located right in the heart of large cities Only a few will be large enough to accommodate the new commercial air liners. But all will be links in a never ending chain which will tie people and places together

In 1940 there were fewer than a dozen air hies operating from one country to another Today there are more than fifty. The planes of these companies will carry the flags of fity four countries. They will criscross the globe in air routes so complicated that every important city on the face of the earth will be within stryl burs of your home town In some ways this new world wide aviation is at the world with a world will be within stryl burs of your Command and the Royal Aur Force Transport Command and the Royal Aur Force Transport Command of the equipment at remote corners of the world But in other ways world air transport.



tation is a direct outgrowth of a desire for permanent peace on the part of the United Nations

CAMADA'S SUGGESTIONS FOR A WORLD AVIATION POLICY ARE DISCUSSED AT CHICAGO

When Pan American Airways one of the original and best known world wide compa mes first sought air routes in foreign coun tries it dealt directly with foreign govern ments From them Pan American obtained landing privileges and other concessions nec essary to long distance flying. The air was free but the land was not With fifty four countries planning entry into commercial aviation it was absurd to think of each separate air line dealing with so many gov ernments An official policy was needed to control air commerce That policy was born at Chicago in November 1944 when fifty two nations sent delegates to the International Civil Aviation Conference called by the United States State Department

At this conference Canada suggested that the governments form an organization which would control air worthiness of planes plot fitness and similar standards. At the same time they would authorize a non government association of air the operators to settle the question of fares and routes as private business men.

Most of us have heard of the famous Four Freedoms which grew out of the Atlantic Charter I ou may also have heard the two freedoms and five freedoms of avia toon decided upon at the Chicago conference But not many beople seem to know what

these latter freedoms are. The nations which accepted the two free doms agreed to permit planes from other mations to fly over the r territory in inno cent flight and to land for fuel emergency words a Bittals artiplane from Bermuds may cross over New York Vermont or Vissacchi words a Bittals artiplane from Bermuds may cross over New York Vermont or Vissacchi words and the strength of the Words and the Word Cartillar of the Words and the Word Cartillar of the Words and the

The third freedom allows planes of one country to discharge passengers in another country. The fourth freedom permits a plane to pick up passengers in a foregn land for the journey home. And the much discussed fifth freedom to 1d allow the planes of one nation to p ck up passengers in another country and discharge them in a third country.

In other words an American plane would be allowed to take on passengers at London and discharge them at Stockholm

Tharty seen nations accepted the basic Chargo agreement which established a temporary international aur organization, known as the Provisional International Civil Avia tion Organization Great steps have altrasty been made toward solution of the organization of the control of the control of the stable of the control of the control of its more than thely that a componise val on the reached to gue travelers fast chargcomfortable air service to every corner of the world

In the meantime aviation in the United States Canada and Mexico provides continually improving service to more and more people. There are many air I nes serving American Canadian and Mexican cities. Thome aviation one should know the names of the major lines as well as the regions with they serve.

FOUR TRANSCONTINENTAL AIR LINES NOW OPERATE IN THE UNITED STATES

In the United States at the present time four are lines operate from the Atlantic coast to the Pacific coast. The oldest of these is United Air Lines. It cuts directly across the North American continent from New York to San Francisco over the more or less straight him route first used by the Government's air mail pulots a generation ago United has been flying this route some 1928.

Once known as the Lundbergh Line Transcontunental and Western Air Inc., was the second cross country air line to carry passengers Its routes originate in New York and run diagonally southwest to Kansas Citu and Texas then angle northwest to Los Angeles American Airlines Inc., the largest of aft

domestic United States art lines was the third company to offer transcontinental service. One of its routes runs southward from New York to Washington D. C. angles southwest through Tennessee to Texas then follows a fairly straight line westward to Los Angeles. Like United and TWA American has been operating for more than ten years as an important hab between coasts.

as his important into between colors at the most recent addition to the best Auriliary for the most form the foreign form the Government to fly directly from Minneapolis to New York 's a result, Northwest most for North Sa result, Northwest most form the foreign form the form the foreign for the foreign for

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operates across the continent flying from New York to Detroit thence to Minneapol's and then directly west to Seattle

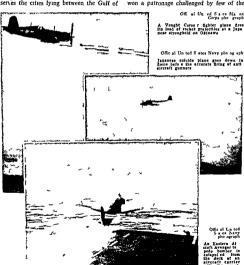
Turning from the cross-country to the reponal air lines in alphabetical order we have. All American Aviation This organization has its headquarters at Wilmington Delaware and operates a unique air mail pick upservice among the smaller cities of Pennsylvania West Virginia Ohio and New York Braniff Auraw's The main offices and

vania West Virginia Ohio and New York Branifi Airways The main offices and hangars are located at Dallas Texas It serves the cities lying between the Gulf of Mexico and the Great Lakes in an area roughly bounded by the Mississippi River on the east and the Rocky Mountains on the west

Chicago and Southern Air Lines The area served is aptly described by the company name with routes extending from Chicago and Detroit on the north to Louisiana and

Texas on the south

Colonial Airlines Th's company has but one main route but its operations on that run between New York and Montreal have won a patronage challenged by few of the



larger air lines. In recent months Colonial has begun a new Ottawa Washington service to give government officials of the United States and Canada a fast travel way between canital cities

Continental Air Lines Operations are based at Denver Colorado planes fly a rough square in the Great Plains states with corners of that square at Denver Kansas City Missouri Carlsbad New Mexico and

San Antonio Texas

Delta Air Lines Started in 1027 as a crondusting service this line cuts sharply across the southern United States between Texas and South Carolina with the main I ne cut in two by a heavily traveled route to Cin cionati

Eastern Air Lines Headed by Eddie Rick enbacker America's greatest flying ace in World War I at headquarters are at New York City It runs from New York to Florida on a direct north south route and to Texas

on a diagonal route Viol Continent Airlines One of the small

est air services it follows the Mississippi River in a north south direction carrying passengers from Minnesota and the Dakotas to Louisiana

National Airlines Its 2 one mile route serves all Florida cit es New Orleans and

New York City

Northeast Airlines This company operates in the region which its name describes. The routes extend from New York City on the south to Montreal and Moncton in New

Brunswick on the north

Pennsylvania Central Airlines This line is unique in that it serves more state capitals than any other line in America. It operates in the great industrial region bounded on the north by the Great Lakes on the east by the Atlantic Ocean on the south by the Ozark Mountains and on the west by the Missis sippi River

Western Air Lines With its Inland Air lines subsidiary, Western connects the big cities of California with the thinly settled states of Idaho Montana Wyoming and South Dakota on a route which fans out from Los Angeles to San Francisco on the north to the Canadian Rockies on the north west to South Dakota on the northeast and to Colorado on the east

Canada has two major air lines Trans Canada Air Lines began operation in 1937 with its 122 mile kancouver to Seattle flight It has a nee expanded to include coast tocoast travel of over 5 000 miles from St. John's Newfoundland to Vancouver and

Victoria in British Columbia Canadian Pacific Air Lines came into be ing in early 1942 by consolidation of several Canadian air transport companies Its routes run porthward like atteries from the man east west lines of communication into Labra dor northern Quebec northwestern Ontario the Prairie Provinces Northwest Territories British Columbia the Yukon and the shores

of the Arctic Ocean They connect with

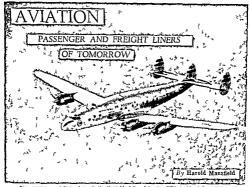
Trans Canada Air Lines and the leading air lines of the United States

In Mexico there are a number of small lines with largely local service and a few big companies which provide the connecting links from Mexican cities to the United States Cuba Central and South America The latter include Compania Mexicana de Aviación (Pan American World Airways) American Airlines de Mexico Aerovías Bran iff Companía Mexicana de Avíacion Ser vicio Aereo Panini and Taca de Mexico

These are the air lines of North America at the moment The coming years may see fewer individual companies as routes and organizations are joined together However aviation's true growth will be measured more by the number of communities and people it serves than the number of air lines operating

Meanwhile the airplane which was born for peaceful use in 1903 has finally come of age as an instrument of that peace It will probably never again serve the mintary forces as it has in the past because the a r war of tomorrow promises to be largely a conflict between pilotless rockets and rad o controlled atomic bombers. Using the air plane peacefully however, can indeed further the efforts of a peace loving world





From coast to coast in ten bours is the timetable followed by the TWA Lockhood Constellation

HROUGHOUT the war people looked forward to the promised 'age of flight which would come as a result of the wide spread use of aircraft in wartime. Now the age of flight is here Already more people than ever before throughout the world are thinking in terms of traveling by air they are sending their mail by air and sending the r packages by air instead of by ground methods of transportation. The reason why people are expected to take to the air in larger numbers than before the war is that there will soon be more air liners available operating more trips per day landing and taking off at more cities and towns than ever before Planes will make their trips much faster than d d previous airplanes The air I ne ticket will cost less than it used to tost And more important scheduled trips will be carried out with complete rel abil ty even in bad weather

The airplanes that will make all this posselle are now being built and some of them are already built. They will not be so differ ent from previous a rplanes in general appearance except that some of them will be much larger than customary air line trans ports The bg d fiferences will be in things unseen—engineering improvements and head developments that were perfected for will tary use during the war will gradually be come available for all transport airplanes operating in the peacetime world

Greatest of all these developments is ra dar the electron c equipment that enabled bombers to see the target despite dense clouds that enabled warsh ps to see at tacking lighters approach in in the night or through heavy weather and enabled mit says amplanes to take off and return again in thickest log. Bodar will be apple dit to compment can be installed at a rports and on pas senser lines:

Radar as you know operates by sending out year shart zadow navies and then prized ing their echo as they bounce back from the land below or from the objects ahead Echoes have long been useful for nay gat ng in fog. The sh ps whistle blows then the men locate the shore by I stening to the echo of the whistle In the case of radar we get an electrical echo and at such a rapid rate that it is actually possible to form an



Hughes Asteraft Company

The Hughes H-4 is the world's largest airplane. It is designed solely to carry freight, Here we see a B 29 and a P-51 Mustang shown for comparison image, or instantaneous picture, of the ob jects that are being 'viewed' through the

Radar will mean a great deal to air trais portation Bad weather will no longer limit flying By using various types of radar and other electronic equipment, it will be pos sible for the air bners of tomorrow to approach the airport through thick fog rain or snow, and to glide down a clearly marked (though invisible) path to the landing runway It will be possible for airport operators to scan the overcast skies and see all the air planes approaching the field on a radar screen although they are invisible to the eye With special equipment it will be possible for air liners to see other planes near them in the sky, and to see mountain peaks or tall buildings in their path although these obstacles are veiled by fog and clouds When such equipment is fully installed it will mean that air line transports can fly on planned schedules throughout the day, and day after day throughout the year, regardless of the weather

The new air liners will have other important safety advantages. Their wings and fail surfaces will be internally heated so that when they fly through snow or sleet no sce will form on them On previous airplanes, ice forming on the wings has been knocked off by means of rubber tubes placed along the front edge of the wing and periodically filled with air But with heated wings the ice can not form at all

Many of the new airplanes will have reversible pitch propellers After such a plane has touched the ground the propeller blades can be turned so that they push the air for ward instead of backward, quickly bringing the airplane to a stop If there is snow or ice on the airport runway, and use of the wheel brakes might tend to make the air plane skid, these new "propeller brakes" will provide a simple means of bringing the big transport to a stop

The new ships will have improved instruments to aid the pilot and co pilot in flying and landing One of these is the 'true altim eter' which tells the distance from the ground at all times with a strictly accurate measurement to within a few feet

The big transports of tomorrow will be able to fly at very high altitudes, above all normal storm clouds, where the air is smooth And they will have long range so that even when storm clouds are extremely high the pilots can easily detour around them Thanks to wartime developments of mili

tary airplanes, the air liner of tomorrow will be faster-so fast, in fact, that most normal long distance trips can be made in a few hours during daytime without the necessity of going to bed in berths at night. Here are just two examples of the high speed of some of the newest transport airplanes the Lock heed Constellation, in 1944, from Los Angeles to Washington, D C, in 6 hours, 58 minutes, an average speed of 330 miles per hour, and the Boeing C-97 Army transport in January, 1945 from Seattle, Washington th Washington D C, in 6 hours, 4 minutes an average speed of 383 miles per hour (The Boeing C 97 is the military version of the Stratocruiser air line transport ) These were speed flights but even in normal air line op erations, planes like the Stratocruiser could make the 2 454 mile flight from Seattle to New York in less than 9 hours, with a stopover in Chicago From New York to London would take about 111/2 hours of flying time From San Francisco to Honolulu would take 8 hours from Chicago to New York, 21/2 hours from Seattle to Shanghai China, by way of Alaska, less than 191/2 hours flying time

#### THE QUIET AIR-CONDITIONED TRANSPORTS OF TOMORROW

Air passengers will find the new transport planes almost as comfortably furnished as their living room at home. This will be especially true of larger air liners, such as the Douglas DC-6, the Lockheed Constellation, the Boeing Stratocruiser and the huge Con solidated Model "37" Improved sound proofing will almost silence the sound of the

mighty engines outside the cabin Labin su perchatering or high bittude ar condition ing will keep the cabin ventilated with nor mig will keep the cabin ventilated with nor mal atmosphere, even when high gat an altitude of \$5,000 feet, where the outside ar is than High bittude are conditioning is cocompil hed by blowers or superchaterers which free more and more air floot the cabin which free more and more air floot the cabin to the cabin proper and the state of the the laboration of the cabin proper size are gets thunce at the high proper six are gets thunce at the high proper six are gets from the

Interiors of the planes will be attractively derocated Scats will be the most comfortable decreated Scats will be the most comfortable that designers can deuse with easy red ing cushoning. The Stratocruser will have an observation lounge in the lower deek below the main passenger deek where the arravelers can go for diversion to ut and fead, or talk with fellow passengers of look out the wind wes just as in the chub car or observation lounge of a modern streamlined.

railway frain

With all of these improvements the cost
of fixing in these great new transports will
still be considerably lower than the cost of

with repetables and fruits flowers penspa pers and magazines mail personal packages and so on

It is expected that there will be a steedy growth in the use of air transportation or it only in our own country but throughout the world as well "such transportation will men a great deal to backward countries which do not have the fine hishways and rankway that we have had for years. The case i getting around the world by air will men also there presently included in the properties of their present in the properties of the properties of the articles of the properties of the properties of the articles of the properties of the properties of the articles of the properties of the properties of the table there is the properties of the table properties of the properties of the properties of the table properties of the properties of the properties of the table properties of the properties of the properties of the table properties of the properties of

Looking still lutther into the future engineers are thinking of new and unconventional types of aircraft driven possible net propelless but by jet propulsion or by other new methods. But these await further engineering development before they are put into use in passenger transportation. That days however, is not is far off as one would day however, is not is far off as one would.

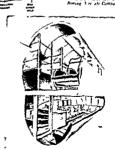


A cutaway view abowing the cabin arrangement of the Rocing Stratecrulier-grat of the large airplanes of the tuture to be built.

The Stratocrainer a upper deck in used for day passenger tents while the lower root rabin is a combination observation dising room and lounge

tracking in pre-war and wartime planes. This is because the designers have found many ways to make the new airphanes more efficient. They will carry greater loads and they will go laster and farther for every dol lar spent in operating costs. Greater stream luming better wroges that will carry a heavier load and many other advancements help to make possible this lower operating cost.

Not only will the cost of a tacket for an ampliane type be within the reach of most people but the cost of sending express cargo by air will also be gradually brought down large cargo compartments will be provided in the passenger planes other aurplanes will carry full loads of cargo. Many types of goods will doubtless be shapped by air, especially where speed of delivery is desired, as



about science for young people



Drawing by James Madenald from ROCKET AND JETS by Herber S Zim published b Harcourt B ace an Company Inc.

I Twould be more amusing than accurate to say that the years books for young people have been actually keeping up with science For in the last few years—especially the one just behind us—science I as made leaps so tremendous that it has good cleans out the heads of amateurs of any age and over the heads of amateurs of any age, and not the possible of the possible feet on the world today and their possible effect on the world today and their possible effect on tomorrow. The man in the street does not possess the secret of the atomic bomb and the boy will not find it solved in his school to the possible effect.

But while that blind and deadly weapon the robot bomb of the Germans was still devastating London a book for older boys appeared that gave them a history of the use of various rockets and a description of mod ern types used in battle today with a preview of some that may be used in the future. This is ROCKETS AND JETS by Herbert Spencer Zim (Harcourt Brace and Company) It tells about high altitude rockets and the problems involved in possible future travel between the earth and other planets It describes the German robot and though the book appeared in advance of Huroshma it tells something about the possibilities opered by adomic energy

By May Lamberton Becker Reader's Guide in Books New York Herald Tribune

This is scientific writing for young people that really meets their needs. We all know that if a young person is strongly interest on a subject he will read any book about of than he Braider; on some subjects—notable meetion and apple of science—the probability is that a boy of fourteen will have kept up to the times in his reading about them rather better than his father has a first properties of the probability in the probability is that a boy of fourteen will have kept to the probability in the probability of the prob

audience out of young and more mature readers I ARCHIUTS SUBMARINFS and AIR NAVIGATION are others. In MAN IN THE AIR this author explains the effects of flying on the human body. All these (Harcoutt Brace and Company) have many photographs and drawings.

Invention and applied science have always been well represented in our books for young folks, and those for the year have been in commonly interesting. How Title Auronoments Learnan or Rock, by M. Him with the common term of the second of t

colored pactures what goes on behind the scenes in picture making John J Floherty has achieved a special fluency in telling fact stories by a combination of plain text and beautiful photographs. His latest is FLOWING FOOL THE ROWANGE OF OIL THE ROWANGE OF OIL THE MICRO PHONE OF BEHIND THE MICRO PHONE OF THE PHONE OF THE MICRO PHONE OF THE PHONE OF THE MICRO PHONE OF THE

CLIMBING OUR FAMILY TERF by Vice voxishing inclures by John English (International I ublishers) tells twelve year-olds about the brological development of man Max's Way from caveman to sky scraper to Ralph and Jedene Linton (Harper and Brothers) traces his development from cave dwellings onward for the same age-range



Illustration by Richard Florthe from PICTURE BOOK OF ASTRONOMY by Jerome S Meyer pub by Lothrop Les and Shepard Co

For younger children is a Pictura Book or Asprovour by Jerome Sydney Meyer (Lothrop Lee and Shepard Company) with Richard Floethe s dran after flustrations Av Orvy Book To Cittastraw by John L Horning and George C McGinness pictures by Helen Armstong (D Appleton Century Company) g ves ten year-olds an introduc tion with experiments guaranteed safe

OCEANS IN THE SKY by Vera Edelstadt with p ctures by Louis Bunin ( Mired A Knoof) presents to ten year-olds the an cient tremendous story of water BURRED TREASURE by Marion B Cothren (Coward McCann) tells us about the geolog cal back ground of coal and even more about its hu man side in mining and through the part coal plays in modern life THE STORY OF WAR WEAPONS by Marshall McCl ntock (J B Lippincott Company) is for the teens a brief history of mankind in terms of mili tary defense from the primitive man's club to bazookas and booby traps. How Planes ARE MADE is in a valuable series by the Aviation Research Associates (Harner and Brothers) There are two new additions to a good series on the great industries of Amer ica Josephine I erry s THE ELECTRICAL IN DUSTRY and THE GLASS INDUSTRY (Long. mans Green and Company)

Often as the mysteries and markels of the Golf Stream have moved young students of geography, there has not been until now a book for them entirely devoted to thus factuating subject. This Gulf Stream by Ruth Brinder has lovely pictures in units of blue by Helene Carter. (The Vanguard Press). This won the prize for the best book for child dren under twelve in the Spring Festival of the New York Herral Trails.

Geography from the air a natural new

travelers is the subject of SKI Highwais by Trevor Lloyd (Houghton Mifflin Com nany) which has drawings by Armstrong Sperry that make a world-circling plane trip seem something in which one is personally involved Vernon Quinn's PICTURE MAR GEOGRAPHY OF THE LACIPIC ISLANDS () B Lippincott Company) tells about the places where so many of our boys have been mak ing history and shows what these regions are like in years less strenuous The Land We LIVE ON by Carol Lane Fenton and Vildre Adams Fenton (Doubleday Doran and Com pany) gives in large photographs and brief well pointed text a clear idea of the mans kinds of soil and landscape we have here in the United States and makes out a striking case for conservation

striking drawings
As will be seen the year s books for young
folks do not attempt to keep them abreast of
however make a well reasoned effort in
supply all along the line the interest of
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# Boy Scouts of America

to boys who helped the Food for Freedom

UNDREDS of thousands of boys joined the Boy Scouts in 1945 to share in Scout work as well as in fun and good times The Boy Scouts have programs for three age groups Cub Scouts are from 9 to 11 years Boy Scouts are 12 years old and upward Senior Scouts are 15 years and upward Among the Senior Scouts are Air Scouts Explorer Scouts and Sea Scouts

All three groups helped win the war In the eight war loan drives that have been held since the war began they took an active part in selling some two bill on dollars worth of war bonds and stamps

When 90 per cent of the boys in a Cub Pack or Scout Troop bought war bonds and stamps regularly that Pack or Troop was given a special award by the United States Treasury Department This was the Scouts at War Minute Man Banner

General Eisenhower approved of the work of the Boy Scouts in the Boy Scouts General Eisenhower Waste Paper Campaign held in March and April The goal was 150 000 tons of wastepaper Cub Scouts and Scouts col lected more than 240 000 tons A World War II Shell Container with a citation from Gen eral Eisenhower was presented to each unit that collected a thousand pounds of paper for each boy in the unit

or the third year Boy Scouts took part in the Green Thumb Campaign to raise food crops Cubs and Scouts tended more than 500 000 gardens

Boy Scouts also worked on farms and helped farmers harvest the crops A Green Thumb Certificate of Merit was presented

program

In the spring of 1945 a campaign was held throughout the United States to collect good used clothing for the suffering people of Eu rope Scouts and Cubs did a fine job in this campaign They collected one tenth of the total of 150,000 000 pounds that were raised throughout the country

Boy Scouts work hard but they don t work all the time In 1945 for instance they went camping more than ever before Hundreds of them went to Philmont Rocky Mountain Scout Ranch the wonderful wilderness camp in New Mexico Cub Scouts had fine times in day camps and did many interesting things in the r home neighborhoods

Air Scouts had a chance to camp and to study Air Scouting under Army Air Corps leaders in special training held in various parts of the country
On October 20 Scouts and Cubs from the

New England states held their Annual Pil grimage to the grave of Theodore Roosevelt About four thousand Scouts from the New England states took part

There are about 1 500 000 boys in the Boy Scouts of America and about 57 000 Packs and Troops There are Scouts in more than

70 different countries Many Scouts and Cubs abroad suffered terribly during the war For their sakes Boy Scouts of America emphasized world friend ship and brotherhood A World Friendship Fund was begun to help rebuild Scouting abroad The theme for the year was Scouts of the World-Brothers Together

### BOY SCOUTS OF CANADA



B H Mortlock

Canadian Scouts trousing the International Bridge be tween Canada and the United States to join Ame ican Scouts at a weekend camp

WHEN Lord Baden Powell founded the Boy South motion in 1968 he basted much of its code on that of the hights of the Round Table One of the traditions of the langhts was that they must of a kind deed every day. This is the origin of the idea of the Boy Scoott Good Turn bare of the property of the set of the Boy Scoott Good Turn bare of the property of the set of the Boy Scoott Good much and the first of the foundation of the community and the not on and for other nations as well

In Aclowna British Columbia the local messpaper published an ed toral telling about the need for a museum for the town The Second Trop of Boy Scotts took up the challenge. They made an old bars into a museum and stocked it with a one embits of the second of the second the se

Another typical community good turn was done by the 134th Toronto Wolf Cub Pack These junior Boy Scouts shared in building the new Toronto Sack Children & Hospital The fifty members of the Pack started a wastepaper drive and with the proceeds they bought a \$50 ketory Bond They gave this bond to the Hospital Building Fund

There are many kinds of good Turns. One was the Seeds for Britan enapoping. Can dam Scott gave several hundred pounging that a fact the property of the property of the Britan for Section 19 and 19 a

The Corpwell Badge is the highest Scout

award in the British Empire for fortitude It has been awarded in Canada less than ten times since it was imagurated more than twenty years ago During the year the Com. Newton Heights Moncton New Brunswick Bobby was injured in an accident in 1937 and has been confined in a cast almost ever since Although he must he on his stomach all the time Bobby has maintained a high standing in school work has kept up his crust and has made a number of airplane models and tank and a number of airplane models and tank and a number of airplane models and tank.

In Saskatchewan for the second year in succession uniformed Boy Scouts had the honor of escorting the Speaker of the Legis lature to his chair at the formal opening of the Provincial Parliament

A Boy-Scout group is made up of a Troop a Wolf Cub Pack and a Rover Crew There were 2 cop of these groups in Canada last year and churches were their largest spon sors. Scout membership during the year grew to a total of 29 cyfs on increase of the control of 20 cyfs of the control of 20 cyfs of the control of 20 cyfs of 20 cyfs

Hts Excellency the Earl of Athlone Governor General and Chief Scout for Canada departed during the year Canada joined in welcoming a new British Empire Chief Scout Lord Rowallan who is scheduled to

visit Canada in 1946

During 1945 representative Soout leaders of South American countries visited Tonoto Ottawa and Montreal They were received by Prime Minister W. L. Mackenie king and were entertained by His Excellency the Governor General and Princess Alice. 

# CAMP FIRE GIRLS

AVE you ever taken care of a brily rat?

And long ago threath little garls in a California town half great lun playing nutraemand to two of these hiely creatures. The gails were members of the Blue Birds which is a junor club of the Cump Fire Gris! South to the Cump Fire Gris a land to the comp for the Blue Birds. When you are ten you may graduate.

into the Camp Fire Girls
These Califorma Blue Birds owned two
baby white rats each weighing only ro
grams A gram is a very small fraction of an
ounce They named the bibles Wiene and
Superman The girls kept charts of the rats
diets and weights Superman was lucky He
dimed royally on powdered whole mill, roo
per cent whole when the rad and carrots
Poor Wiene was given powdered coffee

white bread sugar and turning At the end of eight weeks Superman had grown into a fine, busky fellow He weighed 138 grams And poor Wienie weighed only 26 grams! This group of Blue Birds will never forget what a difference a balanced

det can make
What we learn through pleasure we never
forget is one of the principles of Camp Fire
activities In their weekly meetings Blue
Birds and Camp Fire Girls choose what
they would most like to do with the help of
a Irendly leader. It's no wonder that more
than ago 250 gurls now belong to the Camp

Fire Girls Senior members, fiften years or older are called Horizon Clubbers. They have a special program to starfly their more grown up interests which include personality and good genoming loy firends career and community service. Every year exch. Horizon Club works on some special project such as helping with handicralt for children and servicement in hospitals.

Did you ever stop to consider just what responsibilities you should be able to shoul der at your age? A group of filue Birds in Okishoma City made up the folk wing list If you are between the ages of seven und ten years old see if you think you can do the following things.

r Clean up quickly
2 Act quietly in public places

3 Make more friends
4 Think twice about interrupting

5 Be able to do an errand 6 Read without skipping words

7 I rint without going off the line
Their leader told these little girls that
making up this list was a real experiment in
democratic fixing. The Blue Birds soon dis

covered that they were much more willing to live up to rules that they had helped to make. I very year Camp Fire Girls choose a na tional project and Hi Neighbort was the tost one As the name suggests this was an

tional project and Hi Neighbor! was the 1945 one. As the name suggests, this was an adventure in Iriend hip. As a grand climar to the project many of the groups staged a Neighborhood Fair.

Throughout the nation Camp I re Girl served their country well as hospital ades furm ades victory gardeners child care ades messingers and as purchasers and salesinen of war bonds. While serving their country Camp Fire Girls remembered the joining people of Europe and Asia They sent books clothes toys and other necessities to children in China Russia England and the liberated countries of Europe.



One of the summer camp activities of the Camp Fire Girls was making Christmas t ces for the Red Cross



MFRE can be no doubt that 1945 was a banner year for Canadians of the World War II generation The year saw Ca nadian flyers and soldiers triumph in Eu rope it saw Canadian sailors complete their Atlantic convoy undertakings it saw Cana dian workers and farmers fill the largest production schedules ever undertaken by the country and it saw Canadian scientists con tribute greatly to mankind's most difficult exploit-the spl tting of the atom

The satisfactions joys and sorrows of \ E Day and V I Day were experienced by Ca nad ans in full measure at home and on the fighting fronts. And with the announcements of victory over Germany and Japan the Ca nadian Government put into motion its al ready well laid plans for post war recon

struction and progress With the close of the war, many figures on Canada's total war effort were reported to the nation During the six years of conflict 1 000 000 men and 43 000 women went into Canadian military uniforms and served on every front In the air crew alone 131 533 graduated from the famous Canadian-oper ated British Commonwealth Air Training Plan Approximately 7 000 buildings hang ars and drill halls were constructed under the plan Most of the Royal Canadian Navy s war work was defensive Canadian warships escorted 25 343 merchant ships carrying 181 643 180 tons of vital cargo from North America to the United Lingdom Many other thousands of ships were escorted on the return trips to North America and dur ing the African campaigns and landings. The Canadian Navy lost twenty four ships in en gagements with the enemy Thirteen Cana

dians won the Victoria Cross during the war With the actual fighting over steps were taken to reduce the country's fighting forces The neak war strength of the Royal Cana dian Air Force of 232 roo was cut to 20 000 for the permanent air force after the war In 1939 there were only 4 000 Royal Canadian Air Force personnel Another law cut Cana da s permanent active army to 25 000 men supported by a six-division reserve. That is five times the size of the Canadian Army of 1939 Parliament also set the post war Ca nadian Navy at 10 000 men on active serv ice and 18 000 men in the Royal Canadian Navy Reserve There were only 1 700 men in the Navy in 1939

After V J Day war production figures which had remained secret during the fight ing became public information Many of these figures were dramatic. For example Canadians had produced over \$200 000 worth of radar and optical instruments of types and des gns never before attempted by Canadian workers The first production unit of radar was shipped to the United States Navy in October 1941 two months before the learl Harbor disaster More than twenty major types of radar equipment were produced in Canada during the war

Another production secret made public in 1945 was the fact that the most efficient flame throwers of the war were developed largely by Canadians These deadly weapons gave the All es their final superiority in flame warfare on the Western Front and in the I a

cific zones

A dramatic revelation was the news that during the year at least 250 Japanese paper balloons carrying bombs and incendiary can

isters were dropped on western Canada Re search experts bomb-discosal squads air force personnel Royal Canadian Mounted Police and provincial police Indian trappers and forest rangers joined as a co-operative force and combed the great hinterlands of the West and North to receiver these missiles and render them harmless Fortunately most of the balloons fell during the winter and were buried in the snow Had the loads been dropped in the summer the heavily wooded areas of the Pacific coast could have suffered seriously from fire

#### THE COST OF WORLD WAR II TO CANADA IN LIVES AND MONEY

In 1015 it was estimated officially that the war cost Canada nearly \$17 000 000 000 The Government paid one half of the military and civil expenses by means of taxes It paid for the other half by borrow ing from the people of Canada During 101, alone there were two Victory Loans and bonds totaling just over \$3,000,000,000 were purchased by the Canadian public

Besides the financial cost of the war. Can ada paid in terms of Canadian lives. The total casualties up to May 31 1945 were dead 37 964 wounded 53 073 missing 2

366 In proportion to the population of Can ada these figures are very high

In terms of civilian goods Canada like the United States actually gained through the war The British people tightened their belts -that is they had less civilian goods than they had before the war But Canadians and Americans let their belts out a little They consumed more than they did before the war

The per capita purchases of civilian goods and services in Britain dropped 15 to 20 per cent from the pre war level but in Canada and the United States they increased to to 25 per cent All three countries cut down on motor vehicles---Britain where no gasoline was allotted for ordinary civilian use by 95 per cent and the other two countries by 52 ber cent

The general upward trend in Canada and the United States as contrasted with the downward trend in Britain was shown in such items as Food-down is per cent in Britain, up 8 per cent in the United States and 6 per cent in Canada. Clothing-down 34 per cent in Britain, up 23 per cent in the United States and 22 per cent in Canada Household goods mainly electrical and met al products were down in all three countries but they were down 82 per cent in Britain as

against 32 per cent in the United States and only 28 per cent in Canada

V.C. Day brought changes in Canadian production schedules Many wartime orders which had restricted the manufacture of peacetime goods were lifted Other orders were simplified However in its efforts t prevent inflation the Government did not suddenly lift all wartime controls. Some of the restrictions on production were removed first Man power controls were eased And there was a slow but general return to normal business However price controls were rig idly held on many articles to prevent a sud den and disastrous increase in prices

In order to give the Government contin ued nower to act in a national emergency Parliament passed the National Emergency Lowers Act This took the place of the Wat Measures Act under which the Government had had emergency power during the war

The year 1945 was an election year in Canada There was a general federal election and there were provincial elections in Ontario Manitoba Nova Scotia and British Columbia

#### VICTORY FOR THE LIBERAL PARTY KEEPS PRIME MINISTER KING IN OFFICE

The Liberal party which had won the general federal elections of 1935 and 1940 was returned to power in 1945. The Conserv. atives came second and the Co-operative Commonwealth Federation came third The victory gave Prime Minister William Lyon Mackenzie King the record for length of leadership of a political party. He has held office for more years than any other Cana

dian prime minister

The four provincial elections were inter esting There were three main political par ties-the Liberal the Conservative and the Co-operative Commonwealth Federation (or the Socialist) The first provincial election of 1945 was in the province of Ontario on June 4 It was won by the Conservatives though the CCF Socialists had a strong hope that they might be the victors. That was the first real Socialist setback. It was followed by another Socialist defeat on June 11 when the Liberals won the general federal election In October there were provincial elections in Manitoba Nova Scotia and British Colum bia Liberal Conservative coalition govern ments led by Liberals defeated the CCF Sociabsts in both Manitoba and British Colum bia The Liberals in Nova Scotia defeated both Conservatives and CCF Socialists



Smoke screen apparatus used by the Canadian Army

However the experiment of the CCF So cialist Government in Saskatchewan which won the 1944 Saskatchewan election con tinued to be watched with interest. The first legislative session ended on March to after sitting for six weeks. During that time 120 laws were passed a record in legislation Some of these new laws lowered the voting age from 21 to 18 increased old age pen sions increased workmen's compensations for injuries raised the gasoline tax from one cent to eight cents a gallon gave the govern ment power to take over certain industries to be operated by the government and set up a marketing board with wide powers over the handling of natural products. Other so cialist schemes were also being tried out. One was a large farm co-operative organized in central Saskatchewan at a place called Landis

During the year two sessions of Parlia ment were held The first of these was the sixth and closing session of Canada's Nine teenth Parliament, which had been elected in 1940 It was dissolved in April The Liberal Government had been returned to power by the general federal election in June and the first session of the Twentieth Parliament was called in the autumn These two sessions of Parliament passed many uncortant laws to

help Canada recover from the war

For example the Government established the lowest and the highest price for selling Canadian wheat abroad War destruction and drought had cut the world supply of wheat and it would have been quite possible for Canadian farmers to have asked and received high prices for their wheat on the world market But to ask very high prices would have this effect countries needing wheat would rush into their own wheat proquetion Soon they would not want to buy Canadian wheat at any price. By keeping the price reasonable the Canadian Government has assured a market for Canadian wheat over a long term of years, and has enabled countries to use their energy and time for other important things besides growing wheat That policy is directly opposite to charging as high a price as a customer will pay It has proved once again that Canada can lead the world in economic reconstruction practices

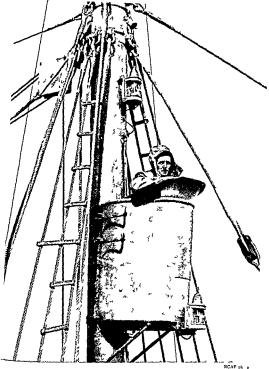
Several steps were taken by Parliament during the year to expand Canada's trade partly by a revival of pre-war markets and partly by the promotion of new ones. A Ca andian Trade Commissioners office was opened in Portugal the first of its kind in the lberian Pennisula

Two months before the war ended in Europe the Government announced it would spend \$30,000,000 in the development of vocational training facilities and courses in the post war period. As part of this re-employment plan the Government set up a mine man committee to help shift men from the armed forces into essential industrial jobs.

#### A GOVERNMENT PLAN FOR THE CARE OF CANADIAN CHILDREN IS TRIED OUT

In January Prince Edward Island was chosen for advance registration under the Family Allowances Act in order to provide experience for registration in the larger provinces. By July 18 the plan was in operation Family allowance payments for 3,000 000 Canadian children were mailed Vinister of Health and Welfare Brooke Claston Said.

Through family allowances, one-quarter of our nation will receive new economic opportunity for better institution, better shelter better clothing more education and recrae toon Family Allowances are a recognition by the people of Canada and their governments that our children must be properly cared for, and that the soundest way to do thus is to spread the cost throughout the entire country.



The course to it. Canad an athy with hy owed her. It is a set of the head forth to it and or oring topy let of a country of the course of the course of the country of the course of the country of the c



At the first session of the Twentieth Par harrent the Government announced its plan to beautify Canada's capital city Ottawa and at the same time to convert it into a permanent national war memorial Plans for a new Canadian flag and for the recognition of Canadian citizenship were also announced Two conferences were held in Ottawa on the subject of Dominion Provincial relations The first one in August, laid the ground work for new approaches to Canada's internal problems A number of federal govern ment proposals were accepted with a few changes at a second conference in November

A number of discoveries and expansions were made in scientific and industrial fields in 1945 The year also saw the announce ment of a number of war discoveries which had been under a security censorship In February the secret of Wing Commander William R Franks ingenious flying suit was made public By using this suit fighter pilots were saved from blackout due to high air speed This gave the United Nations pilots a big advantage over enemy pilots

Another war discovery was a Canadian developed drug named heparin used with a tiny metal tube. The drug and the tube to gether enabled surgeons in the armies of the United Nations to save many arms and legs of wounded veterans. When a bullet or shrapnel cut an artery in two the tube was used to loin the break and the henarin drug prevented blood from clotting Hundreds of amoutations were prevented by this Cana dian discovery

Using raw materials and steam from the government owned synthetic rubber plant in Sarma a new chemical industry turned out styrene plastic a raw material never before produced in Canada Combs trays lenses and other articles for home and industrial use are made from styrene It is more trans parent than glass more buoyant than kapok and a better electric insulator than rubber

It was announced in February that phal hum a soft white metallic material used in



alloys was being produced for the first time in Canada at Flin Flon Manitoba

in Canada at Tim Flon Manitoba
Much progress was made toward rural
electrif cation in the three prairie provinces
Both Manitoba and Saskatchewan com
pleted their plans for the electrification of
most of their rural homes Alberta began an
experiment designed to put electricity into

60,000 of that province's 100 000 farms

As a result of Canadian scientific layestigation in the field of transpolar navigation
aerial navigators in the polar regions can
find their bearings in winter or summer keep
track of changing compass readings and ob
tain a rehable weather forecast in a fraction

of the time formerly required

There were several important developments in transportation. By an Act of Parliament the Trans Canada Air Lines was given power to carry passengers across the Atlantic across the Pacific and along the southern skyways to the Latin American countries Canada became a member of the Commonwealth Air Transport Council which was set up to serve as a medium for the exchange of information on civil air trans port among Commonwealth countries The first tel propelled airplane flight ever made in Canada took place on September 13 when the Gloster Meteor flew from Montreal to Ottawa in less than thirteen minutes This trip took two hours and ten minutes by the

fastest train of that year

The Canadian Pacific Railway converting
to peacetime travel was the first Canadian

rail travel by building sleeping cars having these appealing characteristics. Since more than 20 per cent of Canadians earn their living directly and indirectly by travel that development helped to produce many new post war jobs.

Canada entered World War II with forty ocean going merchant vessels and ended the war with more than 250 of them Some of these nere sold but enough were kept to make Canada one of the maritime nations of

the world

The government of Manitoba established a fund so that a person injured in an auto mobile accident through the negligence of another but unable to collect money to pay hospital hills could get help. Motor car own ers in the province were assessed one dollar per year to build up the fund. The new leg islation was the first of its kind in North America covering traffic injuries

The most notable communications devel opment was in radio The Canadian Broad casting Corporation opened its new short wave mneteen meter band transmitter at Sackville New Brunswick. Reports from his teners on the continent of Europe showed it was the strongest broadcaster from the New World This was due to the antenna system as well as to the location of the station Radio waxes from Sackville travel in the most direct route to Europe and are free from the interference of the North Magnetic Pole

As in former years Canada was in the forefront of international co operation. She played host to two important international



meetings One was the first session of the Interim Council of the I rovisional International Civil Aviation Comm tree which was held in Montreal during August

inclu in Moleca di uning Yugous in Direction in Moleca di uning Yugous In October Quebec City was the birth place of the Food and Agricultural Organiza ton of the United Nations The meeting was under the preliminary chairmanship of a Canadian Michael I. Pearson Canadian Am bassador to the United States The event was widely heralided as the beginning of a new widely heralided as the Deginning of a new singenuity would be combined to assure grentity would be combined to assure the place of the pl

enough food for every human being.
Canada sent representatives to the San
Francisco Conference which drew up the
charter of the United Nations Organization
and her representatives with their staff of experts received prizes for their contribution
to the discussions and agreements. The
House of Commons approved the charter on
Cetoher 19 the Senate on October 25 and
the railfication was deposited in Washington.

The Government announced its intention to part cipate in the international monetary fund and the international bank for recon struction which had been set up by the Bret ton Woods Agreements These arrangements were intended to help the nations recover

their peacetime product on capacities In March Prime Minister Mackeniae Aung went to Washington to confer with the tack Yesselfen Kooweek! Soon thereafter an interest of the Conference of the

Prime Minister Mackenzie Jing spent the month of October in Greet Britain to discuss with British Prime Minister Clement Auther matters of interest to the two coun tries. On his way back from the United Kingdom I rime Minister Jing visited Mar yr Truman President of the United States in November King Attlee and Truman met in Washington D C and discussed the future of the atomic bomb

Other forms of co-operation between Can ada and the United States committee on Education It was set up by the American Council on Education It was set up by the American Council on Education and several Canadian educational organizations and began a survey of textbooks and other teach ng materials in the field of United States Canadian relations Conservation of fish resources of the Great Lakes was discussed by United States and Canadian officials and they recommended that their two countries enter into 3

treaty for the purpose Canada announced in January that she would accept the interm agreement and also the permanent convention on international coil avaition which had been drawn by all the permanent on the permanent of the provision of particular to the provision of the provision of the provision of the provision of the particular that Canada was among the first nations to recept the two freedoms of the air—the privilege of foreign appliance of the provision of the provide provides of the provides of th

American Conference on Rad o Communica tions in Rio de Janero in September And Canada established its first legation in Cuba These were the che flways in which Can ada in 1945 accepted her respons bility as a nation in the world community of nations. And by these activit es she became widely acclaimed as the leader of the small and



Boat-building on Novis one of the Leeward Islands.

## Carıbbean Islands

By Coert duBois

Member of the Anglo Imerican Caribbean Commission

1942 1945

THE United Vations Charter was adopted in 1945 in the city of San Francisco, a long way away from the waters of the Caribbean Sea. Nevertheless to the people who live on the Caribbean salands the signing of that charter was of the very greatest importance. They were especially interested in the agreement of Great Britain Holland France and the United States to three of the chapters in that charter—Chapters VI VII and XIII Let us see what these chapters ago.

chapters say.

Chapter VI is a declaration to the effect that the mother-countries recognize the principle that the interests of the people of their columes come first Great Britain Holland France and the United States accept as a scient trust the duty to promote the politic all economics, social and educational ad vancement of these people. They agree to assist them in becoming well governing. What is most significant, the mother-countries agree to give an account of their stewardship to the Secretary General of the United Nations Organization.

Chapter XII sets up a system of international trusteeship. The purpose of this system is to carry out the principles that you have just been reading about But dependent Jerntories will have a voice in the matter of their trusteeship. Larch application of the system to any territory must be the subject of a specific agreement between the administering government and the depend

Chapter VIII sets up a Trustee Council under the General Assembly of the United Valions Organization to supervise the work

ing of the international trustreship sistem. This agreement means in effect that Great Britain Holland France and the United States have obligated themselves to work toward well government for the Windward and Leeward islands Barbados and Jamaica Guadeloupe and Martinique Curação and St. Eustatus Puerto Rico and the lyrigin Halands.

The goal of working toward self-govern ment is a high one, but we must not expect too much progress all at once In most in stances progress will necessarily be slow The vast majority of the people in many of the islands are descendants of claves who were brought over from Africa There are many among them who can not read or write Fducation is one thing that people must have in order to vote intelligently and intelligent voting is the foundation of suc cessful self government You will remember that among the sacred trusts agreed upon in Chapter XI is educational advancement. It will be interesting to follow the progress made by the colonial governments in carry ing out their new obligations under the

When the Carablean blands organized for war, then found that the had to work much war, the found that the had to work much closely together than they ever had be fore 'Ull of them had trouble in obtaining food and other essential supple and they had to get together to work out then't have portation problems. One work that they worked together tow of the work of the work of the they have been a supple to the them to the work of the wor

United Nations Charter



can recognize schooners by

orders of a Pool Authority in Bridgetown Barbados The schooners ranged from 60 to 200 tons burden, and carried cargoes to points where they were urgently needed, at freight rates fixed by the Pool The Schooner Pool was an emergency wartime creation and the time came when it was not urgently needed It had done a splendid 30b and it was giving employment to about 3 000 people ashore and affoat It was still handling most of the inter island carrying trade. To give up the Pool and to go back to the old cutthroat hit-or miss methods seemed a pity So a peacetime organization has been worked out. known as the British West Indian Schooner Owners Association In its early stages this association will be assisted by certain funds carned by the old Schooner Pool, and these brave little ships will continue to spread their sails to the trade winds

Other peacetime problems are facing the Thousands of laborers were sent from the islands to the United States at vari ous times in the last two years to meet the shortage of farm workers. These people were distributed from Florida to Maine and from New Jersey to the Rocky Mountains They were a great help in increasing the food supply. They got in the wheat and other harvests Some 40,000 of them entered the United States under agreements made with their respective governments which provided that they should be returned to their home islands at the end of the emergency. This was generally considered to be the latter part of 1945 Back home again in the islands, it can hardly be expected that there will be enough jobs for all of these laborers, as well as for all of the soldiers returned from the many theaters of war

#### HURRICANES HAVE WRECKED HAVOC WITH COCONUT GROVES

The hurricanes of the last two years did an enormous amount of damage throughout the islands, particularly to the coconut groves Many groves were wiped out entirely Jamaica's north coast, which was one long grove, is a pitiful sight Coconuts used to be a profitable export crop but now there are hardly enough trees left standing to supply the demand of the local factories for copra, the dried coconut meat which is used to make cooking oil and soap Bananas, too, were hard hit, not only by the hurricanes but by leaf spot disease which renders the fruit unfit for export and finally kills the tree

The greatest employer of labor in the is lands has been the cane-sugar industry, par ticularly in the harvesting of the sugar-cane The cane was planted on large estates and harvested by hand by large numbers of canecutters It was ground and made into raw sugar molasses and rum in local mills and distilleries These products were sold abroad,

largely in the mother-countries Of course the people of the islands had to have something besides sugar to eat, but they grew very little of their own food A large part of what they ate was shipped in from outside, especially rice, salt fish and meat This way of earning a living and of getting enough to eat is called a sugar economy The war upset this economy Many ships were used to supply the armed forces of the Allies Other ships were sunk by enemy submarines Since these ships could no longer bring in

supplies, the food shortage grew serious Now the question is, what is going to happen when shipping is again available? Are the islands going to go back to their old sugar economy?

#### NEW PROBLEMS FOR THE ISLANDS SUGAR INDUSTRY

There are certain indications that the sugar situation will be more complicated in the future than it was in the old days. In two years or less the Philippines and the Dutch Last Indies will be back in full production of sugar, and the beet sugar industry of Europe will also be back on its feet Probably the world will see the end of a sugar shortage by 1947 And then what? If too much sugar is produced Caribbean sugar will not bring a

. ....

good price This will mean suffering poverty and unemployment for thousands of iamlijes in the islands of the Caribbean Too much sugar is what there will be unless there is some system of international control Here is a job for the Economic and Social Council of the United Nations Organization and it will be interesting to see how they handle it

#### FISHERIES CAN BE MADE TO YIELD A BRITER INCOME

On the brighter side of the ledger there are two industries which through research study and organization, may help the economy of the islands very much. These are fisheries and tourist travel A great deal of research has been done on fisheries in the last two years Technical experts have surveyed the marine food resources and fishing methods of Jamaica British Honduras and the Ba hamas In reports to the local governments these experts have made recommendations for improved techniques in fishing and in handling the catch A boat was loaned by the United States Navy and fitted out with up to-date gear including otter trawls and purse seines An expert from the United States Fish and Wild Life Service and a British fishery expert spent several months aboard this boat in the Gulf of Paria and off the British Guiana coast and off the island of Tobago, studying marine life and devising improved methods of fishing for the natives

Sharks were the subject of a Cartibean wide study A pamphlet in sumple language was published by the Anglo American Carib bean Commission telling the island boys what gear to use to catch the sharks and how to prepare the skins liver oil fins teeth and meat for market Several thousand of these free pamphlets have been distributed through local governments and social selface organizations. In 1945, the pamphlet was being timulated into Spannis for use in Tuerto actions to the state of the state

The eastern Bahamā study con-red the waters of the Islands from Long Island to Muchoir Passage As a result a dried salt fish industry was started in a small way and has already found a market in the towns on the north coast of Hatti Studies are now being made of the Leeward Islands and the Saba Bank The latter is a large inne-fathom bank a few miles to the westward of the Dutch Island of Saba Unit his present

study its fishery resources had been totally unexplored

Tourst travel has also been the subject of a Caribbean wide study. An elaborate report was published by the Anglo American Carib bean Commission in June 1945. This de scribed the principal sites which are or might be developed as tourist attractions in all of the British Dutch French and United States islands and in Coba Haut and the Domini can Republic. The report presents are ground a tourist industry valued at \$60 000 000 at jear A conference of all agencies micrested in travel in the area was held late in 1045.

In short the most encouraging feature of the year in the Caribbean is the growing tendency of the people of each island to see beyond their own little spot of land Both the peoples and governments of each island are beginning to think a great deal more about all of the other islands. They are getting together more and more to study and work out their common problems In 1045 a second West Indian Conference was planned to be held in the immediate future probably in the United States Virgin Islands to be attended by representatives of all the island peoples Every such meeting helps the scattered islands to understand each other and makes it easier for them to work to gether to solve their common problems



Courtesy Cuban ha enal low at Come so on In Cuba add two-wheeled carts like this one carry the cut sugar-cane from Sold to mill.

### CENTRAL AMERICA

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THE five independent countres of Central America—Costa Rica F. Islandor Guatemala. Honduras and Nicaragus—nemt to war against the Visi. in December 1991 to war against the Visi. in December 1991 Since that time the Rica been cooperating looks with the Linted States and the other countries of the Western Hemisphere. The took part in the Inter American Conference on the Problems of War and Peere held in with the Signed the important. At of I Chapulletpee drivin up by the conference (See the article on Western in this Nimusal).

As members of the United Nations the entral American countries sent delegates to the United Nations Conference for International Organization which opened at San Lamic Co in April 25 1045. They all squed the United Nations Organization charter about which we tell you in the article on the Lutted Nations and Wurful Proce.

There were several important political desipments in Central Ameria in 1045. Fl Saladay held a presidential election in Januar. This small country had seen much violence fin 1044. V general strike had been cilled in May of that year as a protest actuate the administration of President Vaximbiano Hermandice Varinties who had been in power since 1032. Hermandre Marvial Proposition of the Saladay of the temporary Lagration et the Been set sipwith General Andres Januaro Menodice as president Mendock raid been forced to give way in his turn in October to Colonel Osnila Aguirre Salmas.

The liberal opponents of Aguirre Salnas denounced his potentiment as "dictatorial denounced his potentiment as "dictatorial and factist" some of them estal libed a government newle in Guatemals Others remained in LT Substantial Comment of the Com

The country was thrown late an uproar

shorth before the election when the four candidates opposed to Aguirre Salinas with drew from the presidential race. The claimed that their supporters had been ter rorared by the provisional government, and that under the circumstances a fair election was impossible. When the election took place, therefore there was only one candidate, General Castaneda Castro Naturallis he was elected pres dent.

The provisional president, who had backed Castaneda Castro as ne have seen claimed that the electron had been perfectly fair He pointed out that the right index finger of each voter had been marked with indelible ink after he had cast his vote so that he would not be able to vote more than once But the liberals who had opposed the provi sional government observed that, whether voters cast one or ten ballots apiece the re sult would have been the same since there was only one candidate. They also reminded the people that the president-elect had been minister of the interior in the old govern ment that had been overthrown in 1944 Would the citizens of F1 Sahador be any better off than before?

However the new government proved 1: be a pleasant surprise One of the first acts of Castaneda Castro after taking office on March 1 was 1 declare a general ammesty or pardon, for political offenses. He urgel political eviles to return home promiting that they would not be no lested and that they would enjoy all the rights of citiernship.

As time went on it became clear that Castañeda Castro was determined to govern in the interest of all. A revolt against the government was started in July, but the revolt was crushed

Guitemals had also passed through a period of resolution in 1944. General Jorge Usico who had been president since 1941 had been forced to resign in July 18 in 11 Salvador the fest providinal government to be established was overthrown, the government was then turned over to a junta or ruling group of three men in December 1944 a national election tak place 19 Julian 19-4 Strevla a well hown reducts.

was elected by a big majority

The month of Varch 1945 was a notable one in the history of Guatemala It saw the mauguration of President Arevalo It also marked the adoption of a new and progres sive constitution which sought to pre-ent one man rule and to make Guatemala a genuine democracy. It provided that no president should succeed himself until had been out of office for at least twelve years. To keep the army from meddling in politics the constitution provided that no come a circulate of the results of the president should be a support of the provident of the president of the president

In March, too there began a vegorous campain to reduce the number of illiterates campaint to reduce the number of illiterates (An illiterate is a person who can not read or write a literate is one who can read and write 1). A law was passed in March proxiding that each literate Guatemalan between the ages of eighteen and saity was to teach an abiliterate person how to read and write This law was patterned after a Vesscan law of August, 1944. Il provided penalties for literate Guatemalians who took no part in the campaign against ignorance against signorance and the campains against ignorance against signorance and the campains against

There were no important political changes in the other countries of Central America President Tiburcio Caras Andino of Honduras and President Anastasio Somoza of Nica ragua have been in office for many years and so far they have successfully resisted all efforts to force them out They offer a good example of what is called continuismo in Spanish This word is used in speaking of national leaders who continue in office by having the constitution changed or by hold in government-controlled elections.

As for Costa Rica at has set an example of orderly and democratic government for many pears. That record was marred somewhat in \*February 1945, when a series of anti-government rots took place. These out breaks which were led by followers of ex-Iresident Leon Cortes were put down by the government. The general public continued to give its hearty support to I resident Teodoro Picado Michalski.

Lnder this president who was elected in February 1944 the government has been distributing to small farmers land that is not being used Some of the land granted under this program was bought from large planta tion owners some of it was taken from German owners after Costa Rica declared war on Germany The land distribution program has increased the available supply of food crops and so has proved to be a valuable weapon in the fight against steadily increasing living costs.

The project of combining all five Central American countries in a single federal union has often been proposed in the past. It was revived in May, 1945 when the presidents of Guatemala and El Salvador met in order to discuss plans for a union between their two



All p ctures courtesy Co-ord nator of Inter American Affa ra

the highlands of C mais Every group this country a samp different uniform, w shows from what viit came.

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countries. In a statement issued after the meeting the two presidents proposed first of all to remove all customs barriers between El Salvador and Guatemala to create a sin gle banking system and to permit free im nugration from one country to the other Political union would come later The two countries would be joined in a loose kind of federation in which each nation would keep its sovereignty

The two presidents made it clear that they looked upon the proposed umon between El Salvador and Guatemala as only the first step in bringing about a wider union binding together all the countries of Central Amer ica An official statement issued after the meeting said it was agreed to invite the heads of state and the people of the Central American republics to 10 n the federation

So far the proposed union between El Sal vador and Guatemala is still in the discussion stage, nor have the other countries of Cen tral America shown much interest in the matter. The prospects for a five state Central American federation are not bright

The region that we call Central America includes not only the five independent coun tries that we named above but also British Handwas, a colony of the British Emoure Guatemala has laid claim to this territory at intervals though it has not pressed the mat ter so far In 1045 Guatemala again set forth its claim to British Honduras in Article a of the new constitution

Great Britain points out that the present boundary between Guatemala and British Honduras was fixed by an agreement signed in 1829 and ratified by both countries But Guatemalans observe that in the agreement Great Britain promised to build a highway from the Atlantic coast to Guatemala City the capital of Guatemala Since the British have not bu it the road in question the 1859 agreement is no longer in force according to Guatemala The dispute has been carried on in a gentlemanly spirit. It should provide lively debates between the two countries for some years as no settlement is in sight





## CO-OPERATION



We matter how long or how hard they try the men can not cut down the tree by pulling away from each other But when they work together each one pulling in his turn the job is seen done

#### By William C Lehmann

O OPERATION is a hie word an active word it means working together. Without co-operation our very homes our schools our churches, society itself could not exist. Without a good measure of it there could be neither government business nor community life.

Our forefathers here its meaning well in the village communities that made up there life for thousands of years and in the frontier settlements of early America it brought success to the Furopean guild existen that bound together merchants maker workmen to the forest continuous realizations in their work. Their states of the forest continuous continuous training to the forest continuous and the forest continuous and in many ways the people of Denmaria make co-operation a foundation stone of duly Ixing.

In the teening life of our modern cities and to a lesser extent also on our farms to-

day, co-operation has apparently come to be onershadowed by individual enterprise and competition. But we need only look at the working of any large business concern or of a labor union or of the manufacturers asso crition of our own home town to realize that even today we can not exist without a considerable measure of co-operation.

Spelled 'team work it expresses a combination of individual effort fair play and working for a common goal most easiliunderstood by every boy, and gut 'Spelled' the world of ours car still be raide a place in which all peoples can live and work happly together—this new world in which London and Moscow and Chingking are only a few hours journey from one another by air bor raide in the fraction of a Sector!

Co-operation as we have seen means working together. It stands for the sort of



Children co operate to make beautiful music. effort in which each one of us plays an im portant part. A player on a school baseball or football team may not be a star but he is an important member of the team if he works for its good instead of for his personal glory He is important when he hits a sacri fice bt nt and advances a runner from first to second base he is important when he takes out a would be tackler and thus makes pos sible a touchdown run Just so in the life of the community and in the business of mak ing a I ving co-operation demands that each one should make the most of hunself not for the sake of personal advancement but for the good of the community as a whole The re ward of effort in a co-operative spirit is rich er because there is more to share and there are more to share it In fact it is the very heart of free enterprise and the democratic way of life

Co-operation may mean any free associa tion between two or more persons or groups or communities working together toward a desired goal in a way they have agreed up on The word has also come to mean a par ticular kind of business activity in this people organize and own and control the busi ness themselves in a kind of mutual self help

It may help us to understand co-operation better if we remember that there is always in the world about us a natural kind of work ing together. We may not have planned it and we may even be unconscious of it yet without it none of us could live at all Even in nature there is a web of life

that binds individuals and kinds together Swarms flocks and herds instinctively stay

together for mutual protection and support Ants protect the aphids that in turn provide them with honeydew Pilot fish and sharks are said by sailors to work together Many animals post lookouts that give alarm signals when danger approaches Among horses on the steppes leading males will take a key fighting position to protect their herd against attacking wolves. In the beehive and among some of the ants and wasps there is a divi sion of labor and a co operation so marve lous that it is almost the envy of men

In the life of men too there is much co operation that is scarcely at all the result of conscious planning

#### PRIMITIVE PEOPLE BARLY LEARNED THAT THEY MUST WORK TOGETHER

The most primitive men of whom we have any knowledge were always banded together in some kind of family or horde and later in a tribe for protection against weather wild

beasts human enemies or hunger Among primitive peoples today some will be hunt ing or fishing while others gather roots or berries or scratch the soil in rude agriculture and still others care fo the children Yet all work together to provide a living to protect their kind to win the favor of their gods And those who break the ranks who refuse to co operate will as a rule be severely punished

Our own forefathers lived in agricultural village communities. Here each family had its own strips of land its own cattle and its own harvest but the families worked their fields together and herded their cattle and sheep or goats in common pastures. Their woodlots were open freely to all and their strips of land were re allotted from time to time so that all had an equal chance at the favored plots of ground They lived by com mon rules they all rushed to put out the fire in their neighbor's thatched cottage they played and sang and danced together on the village square they worshiped in the com mon church and when they died they were laid to rest in the ancestral God's acre

Today our villages have grown into towns and cities with thousands sometimes even millions of people Our neighbors are so many that we do not even know most of them Instead of an occasional null or smithy we have a complicated network of factories and market places, of railroads that cross whole continents and ocean liners that the continents together Air transports slip over Greenland or the North Pole to deliver their cargoes in what was once faraway China

But still there is co-operation between factory and field between the cutton grower, the textile mill and the abop on Main Street between the fruit and sepectable grower in California and the man who eats his break last in New Jork or Boston or Montreal There is co-operation, too between factory owner and engineer and worker, between manufacturer and banker and our local merchant

But because most of our neighbors are so far away and our village community has really become a whole world community we have lost something of the old sense of fiving in a neighborhood. Yet co-operation is even more necessary than in the old days. Modern business is an exchange of services among neighbors trade is still an exchange of goods

among neighbors
Today our whole world is rapidly becoming one vast neighborhood again. Men are awakening anew to the meaning of co operation as a conscious, forward looking program and to the needs and opportunities for cooperation in every realm both of our national

life and of our larger world community

Let us look now at a number of ways in
which such co operation has already been
tried with marked success and with greater

promise for the future
Such co-operation may be seen at its sim
ple best among farmers and fruit growers in
dry country where fields must be irrigated
Crops can not be grown without water. Wa
ter can not be brought to the fields without

tapping the stream up the valley Expensive dature naterways and water gates must be built and ditches must be run through the fields of A B C and D II each tred to tap the stream himself or if A or B up the valley refused to allow water to be run through their waternays to the fields of C and D down the valley or if A took all the water to himself when there was little of it those faither down the valley would lose their crops and farming generally would become impossible. By co operation they have learned to make the desert blossom like the

In industry we are fast learning that over work or underpay and poor conditions of work make for poor workmanship and there fore loss to the employer as well as poor in ing for the worker. And when workers unite to get equal bargaining power with their em ployer expensive strikes and lockouts and loss of time and great bitterness may threat en ruin to both employer and workers. But if the two sides come together and talk it over they often find that half of their wrongs have grown out of their fear one of another and half of the rest are not really wrongs but hardships neither side can do much to avoid while the remainder can best be adjusted by shop committees and other expressions of mutual confidence and co-on eration. In fact, Jahor unions and trade associations may in this way themselves become instruments of co-one ation between worker and employer instead of co-operative weap



Office of the Coord nator of Inter times can 402 a

ons of undustrial warfare wasteful for both Every city has many agencies to help the underprivileged to provide lessure-time ac tixtuites (such as the '\ or the Soutts camps) and to look after the health of the community. If all go their own way there will be coeffy revalues and overlapping, and more task times are left undown. In missi cities now such agencies have learned to Jon hands in community chests and councils of social agencies and the whole community benefits. This is community co-peration.

And so with our churches our schools the work of the Red Cross the work of screentific research of farm and home improvement. In all of these we are rapidly learning the less onto Geo-operation some with government and and some without it some merely in the local community and some throughout the wold—and the life of our communities is being made the richer by it.

#### OUR BEST HOPE FOR PEACE IS IN CO-OPERATION

World War I and the far more destructive World War II and in between them the great depression have driven home the lesson that between nations also there must be co-operation if we are not all to be destroyed by war. Many hopeful beginnings have been made.

In 1920 shortly after the close of the first World War there came muo being a Legue of Nations, with beadquarters at Geneva Switzerland This was perhaps the most promising experiment in world wide co-oper ation ever true Though it was unable to prevent the outbreak of World War II it accomplished many fine things.

Under the League there was a Perminent Court of International Justice with fifteen judges representing many nations sitting in court at The Hague in Holland to settle disputes in the meaning of treaties between nations and to interpret international law. The United States took part in this court.

Affiliated with the League was the International Labor Office with headquarters at Geneva. This organization accomplished great things in the creating of better stand ands of labor the study of unmigration the promoting of safety and health work also in opposing child labor and in many other ways. It brought labor groups together in peaceful to-operation

On page 316 we tell you of a fresh attempt to bring the people of the earth together in peaceful co-operation, under the head in The United Nations All men of good will hope that this new union may succeed white the figure of the peace of the conting dayness between countries will no long er serve manhand but only destroy it Cooperation is more difficult than discussion but the time seems to have come when the difficult tesson, will have to be learned

As early as the year 1910 there was set up the Carnegue Indowment for International leace "to hasten the abolition of international war and to promote co-operation be tween nations through scientific research through the holding of meetings and through education.

YOUNG PROPLE CAN PROMOTE

#### PRIENDSHIP AMONG MATIONS

One of its divisions is the Institute of In trenational Education with headquarters in New York City This institute helps in therethange of both students and teachers between the United States and other coin interest the world over By studying and fetch ing and living together, many people excellently young people from other better and then go boine and work for international understanding and cooperation.

For several years the United States Department of State at Washington D C and the National Educational Association a voluntary organization have joined hands in a number of practical ways with similar agencies in other countries in matters of educational co-operation. This is pointing the way to an International Education Office

#### MAIL COES TO ALL PARTS OF THE WORLD BECAUSE NATIONS WORK TOGETHER

Except when war interferes tens of bil lions of pieces of mail are delivered all over the world every year without interference of national boundary lines. This is made possi ble by the co-operation of nearly all coun tries of the world in the International or Universal Postal Union which has operated successfully since the first international post al convention was agreed upon by twenty one nations at Berne Switzerland, in 1874 In this convention the twenty one countries agreed to consider themselves a single term tory for purposes of mail delivery Any dif-ferences between nations in the matter of mail service are adjusted through this Postal Union French is the common tongue of the Union



Rope for an era of peace through co-operation Signing the United Nations Charter at San Francisco standing and good will among the nations

No greater honor can come to anyone in the field of sports than an Olympic cham pionship The Olympic Games are a form of international co-operation in sports For over a thousand years such contests were held every four years in ancient Greece and if any of the Greek peoples were at war an armistice was called for the duration of the gimes In 1896 this idea was revived in Ath ens and since then there has been world wide participation in these modern Olympic Games They have been held every four years except in 1916 and again in 1940 and 1944 when war interfered One of the chief

Another splendid example of international co-operation is the Pan American Union with headquarters in Washington D C All of the twenty one republ cs in the Americas are represented in this un on and it is spon sored and supported by these governments themselves Its purpose is to develop closer commercial and intellectual relations and to

promote international co-operation With out it these nations probably could never have formed an almost sold front against the Axis powers when the second World War threw nations into turmoil

Let us look now at co-operation in the nar



From the Control of the Pon American Building to Washington D C The Union made up of twenty are tricked years to get the Pon American Building to Washington D C The Union made up of twenty are tricked republic to its applicant of azampta of how notices can we be together to achieve unitself good with

People living in this fine apartment house own it to gether Sharing the costs they are able to have a better home at less money than if they bull a parate hour a

rower sense of co-operatives and the co-operative movement

Consumers co-operatives are the most unportant form of this movement. They are first of all businesses like any other businesse except that they are organized and orned and controlled by the patrons they are in tended mainly to serve. They have one aim to serve consumer needs (Consumer means user When you buy a load of bread to eat or a school notebook or a pencil or a new suit; you are a consumer.)

A group of people usually neighbors or workers in a certain factory or members of a local church will get foether and set up a grocery store a gasoline station a general merchanise or farm single for feet store to serve their own needs. They for some of their savings to start the business and true usually leave some of the store earn ings or dividends in the business to buy

They maintain high standards of service to the consumer and sell only for cash and at about the prevailing market price. If a buyer knows what the consumers' co-operatives charge for a certain item he has a good idea of the fair price for this item.

A number of such local co-ops may form a league with other co-ops and organize their own wholesale supply services and oth their own wholesale supply services and other services such as testing for high standards and carrying on educational work. Often these wholesale co-operatives when they have grown sufficiently large and strone set up or purchase their own factories mills or bakeries, sometimes even farms or planta.

tions, oil wells and refineries. They may operate their own trucking and transportation services and even railway oil tanks and oil pipe lines and ocean liners. Later they may also set up their own credit or banking fecilities.

They thus become not 'producers co-

operatives, but production and distribution and advantage and as well as retail co-operatives—though always guith an eye on service to consumers. The ear of course many other kinds of consumers co-operatives. Many of them supply services trather than goods. Among the Petter known and established of these supply services trather than goods. Among the Petter known and established of the supply services that the supply services and and the supply services are supply services. The supply services are supply services and death benefit and burial societies farmers telephone and rural electrification co-operatives building and loan associations farm loan associations.

Not all are co-operatives in the strict sense. Among the less known or less tried are co-operative housing projects and apartment houses rooming horses restaurants and similar services group hospital and health insurance associations and co-operative hos pitals book stores and library loan services laundries funeral and undertaking services. Tennis courts bowling alleys and similar services for fun have sometimes been co-operative hospitals and the services for fun have sometimes been co-operative hospitals.

erative ventures
Credit to operatives are a form of con
sumer service. A man with only small say
mags and little or no life insurance to borrow
upon often needs ready cash to pay doc
tor s bills to meet some pressing famils need
or even to get a better bargain man automobile he may need for his work. He can



When many people pay a small sum each year into a less tallization plan there who fall ill can have the est of care in a hospital at little or no extra cost.

not borrow from banks and sometimes not even from personal finance companies because he can not provide the security good business practice requires of these institu tions and he can not or goes not want to borrow from friends or neighbors. As a rule he can turn only to pawnshops or certain loan offices where interest rates are usually very much higher than they appear to be on the surface

Credit unions are associations of people usually working in a single factory or mem bers of some organization or otherwise per sonally known to each other who put their savings together and form a loan fund from which members may borrow. The funds are well protected the loans are carefully made though risks are sometimes taken where the needs are great There are few if any sala nes or other expenses to pay Employers often provide space and clerical workers and other services without cost to such credit unions among their own employees Interest rates rarely amount to more than 1 or 11/4 per cent per month often little more than 6 per cent per year There have been almost no losses or failures recorded Dividends to shareholders are strictly limited Like banks the credit unions operate under government control nearly half of those in the United

States under federal charters In a recent year there were about 4 000 such chartered credit unions in the United States and Canada with an estimated mem bership of 4 000 000 and an estimated busi

ness of about \$325 000 000 Finally there are producers co-operatives or producers marketing co-operatives These are usually groups of farmers dairymen cot ton-growers fruit growers or such who form

associations for the purpose first of all of marketing their products at the best price they can get and without paying middle men's commissions. These associations also provide their members with many other serv ices And just as consumers co operative take on wholesale and production and other activities so producers co-operatives often purchase co-operatively their own feed gaso line farm implements and so on and thus become consumers as well as producers co

operatives There are a few but only a few produc tion co-operatives that is associations on erating farms factories and the like co-oper atively for sale on the general market

Then there are of course co operatives banded together in leagues going all the way from local and regional groups to nation wide and international organizations such as the Co operati e League in the United States and the International Co-operative All ance These belp in many ways to pro mote co operation

They usually operate on the so called Rochdale principles These are open mem bership democratic control limited interest on capital dividends according to patron age neutrality in religion and politics sale for cash at market price constant ed ca tion and continuous expansion

The beginnings of modern co-operatives are usually traced to a group of twenty e ght weavers in the little v llage of Rochdale in Lancashire England who formed the Equi table Society of Rochdale Pioneers in 1844 They ra sed \$140 to open the first co-op store to supply the r needs for food and clothing at far prices

From Rochdale the novement spread



Murts Bro he ct operative oil re sery at McPherson axes run for the saelt of the large

with many ups and downs and ever enlarg ing organizations all over the British Isles Later co-operatives became popular in the Scandinavian countries and the rest of Eu rope and in other continents as well Today there are 70 800 000 families in 39 countries buying about \$20 000 000 000 worth of goods and service a year through co-operatives In Great Britain over half of all fami lies belong to the co-operative movement one eighth of the nation's retail business one seventh of its food d stribution and one eleventh of the wholesale business is done by co-operatives The banking department of the wholesale society is equal to that of the fourth largest bank in England In Den mark 70 per cent of all livestock and farm products are marketed and 70 per cent of all meat packing is done by co operatives. In most European countries from one third to two thirds of all families are affected by co operatives

In the United States and Canada the movement was slow to take root Since about 1920 however farm marketing co-opera tives then oil and gasoline and feed purchas ing co-operatives and most recently general consumers co-operatives in town and coun try have increased by leaps and bounds un til in a recent year there vere in the United States more than 7 700 marketing co-op eratives with an estimated membership of 2 580 000 and an estimated business of \$3 180 000 000 and more than 2 700 purchas ers co-operatives with an estimated mem bersh p of 1 270 000 and a business of \$600 000 000 Among the service co-operatives there were 850 electricity distributing co operatives with an estimated membership of 1 210 000 and an estimated business of \$35 000 000 and 2 000 insurance associations with an estimated membersh p of 10 000 000 and an estimated business of \$185,000,000

Nearly all co-operative associations carry on educational programs in the work of the particular organization. They explain the principles of co-operative business and cooperative community living Very many of them also engage in recreational and other fellowship activities

Co-operatives then are a modern expres son of the co-operative spirit Already as we have shown you this spirit has resulted in great gains to mankind Yet much remains to be done

For example in some communities punds and teachers and parents—in fact the whole neighborhood—join in making the school a neighborhood—join making the school are community center College and distorber contents of the continues become centers of the continues become centers of the continues and in the continues and administrators co-operate in planning and managing the affairs of the school college for university) and town work together for the common advantage of all If this part of the common davantage of all If the continues the continues of the continues of the continue of the common davantage of all If this part of the common davantage of all If this part of the common davantage of all If this part of the common davantage of all If this part of the common davantage of all If this part of the continues thave the continues the continues the continues the continues the c

As we have pointed out group health and medical insurance programs have already proved successful. They point the way to a much wider range of health services and health activities. There is also plenty of op portunity for increased co operation in such fields as adult education play and other lessure time activities youth hostels ama teur dramatics and so on

Increased co-operation is also called for as the ratio television and the airplane come into ever wider use. There would be turnoil if every radio station were to adopt an wave-length it pleased or if air lines were to be set up in regions that alrendy had far more than they needed.

We know what great advances have all ready been made in the field of pure scence because men and women have worked to gether without thought of self but for the good of mankind What a wonderful world this will be when all scientists whatever their country may be join harmoniously in the good fight against disease and pain and drudgery and poverty!



## Decorating as a Career

#### By Helen M Needham

EVER since the dawn of history when man decorated the stone walls of his cave with drawings and paintings, he has been interested in the appearance of his home Modern man's desire to make his home attractive is as strong as that of his cave man ancestor. This desire has given rise to the fascinating business of interior decorating

Many decorators today have the delight ful task of making life more pleasant by cre ating pleasant places to live in Interior dec orating is not only fun but profitable as well It is little wonder that thousands of men and women have chosen their life work in this absorbing field It is particularly appealing to women because it puts their special talents to the fullest possible use—their sense of style and beauty their joy in shopping and bringing together lovely and useful things for the home

Decorating is an ever changing profession Man has always liked to change his taste with the shifting trends of the times. In his



Learning to be an interior decorator is fun Uning actual materials, students match and herm lears to bring out the most pleasing contrasts among the textures of fabrics painted surfaces.











Rensläsance chair des gns From left to right are an Italian Dante chair a Spanish armchair chair of the period of Louis XV and an English chair of Queen Elizabeth a time the Tudor period.

home-as in his politics-he has always seemed to say Off with the old and on with the new This truth about human nature is one of the reasons that so many trends have come and gone in the field of interior decora tion

It is possible to learn something about seople just by studying their homes If we look in old magazines and books for in stance we may see pictures of the crowded rooms that matched the elaborate dress and sentimental viewpoint of men and women in Queen Victoria's day By way of contrast when we study the furniture built by the Shakers we see how its sturdiness and sim plicity reflect the sober values of their lives

In museums we may revel in the wonder ful variety of furnishings of bygone days We may see with our own eyes the kinds of chairs and benches that people used to sit on long ago the chests in which they stored their treasured linens the beds they slept in and tables of all sizes that they used in many ways As we marrel at the great beauty of woven tapestries we may remember that their original purpose was to hang on the walls of the very wealthy to keep out the drafts, long before there was such a thing as

central heating And gallery after gallery of paintings by great artists remind us that people of olden times liked to have beauty grace their homes just as much as the early cave men did Beauty as well as usefulness are the twin goals of the interior decorator today

An interior decorator is a creative artist Almost anyone can put furniture and rugs and lamps and curtains together in such a way that they will serve a need But a person who has not been trained as a decorator usu ally juggles together all the ideas he remem bers from the radio newspapers movies and magazines Such hit-or miss methods may or may not secure the right effect A skillful decorator on the other hand knows how to produce the exact effect that he would like to have

A decorator must have sound business judgment. Only the decorator who is able to plan interiors within the client's budget will succeed

The aim of the interior decorator is to create the one background that will exactly suit the person for whom it was planned A task such as this can never be merely mechanical or cut and dried No two clents will be exactly alike nor will their needs and













A graceful sofa designed by the American Duscan Phyte
tastes he alshe Each will have ideas that are

different from other peoples and each will have different amounts of money to spend Suppose that you are an interior decorator and have one client who is fond of simple

and have one client who is fond of simple modern design and another who prefers the warmth and richness of old Spain. These two people would require quite different backgrounds. You should be in sympathy with their wishes and do your best to understand them.

In few occupations does the personal element enter as strongly as in interior decorating. The decorator must possess the ability to understand and handle people. This means that he must be able first of all to make people like him. He must be patient and fair. He must realize that in working with people before are unavoidable mistakes and unaches are unavoidable mistakes and unaches are the strong of the properties of the

If you decide to embatk on a career in interior decorating you should try to have the very finest training Ideally you should have from two to four years of college with a fine atts major followed by two or three years at one of the good art schools where excillent courses in interior decoration are given As in all professions.

the reputation scholastic standing of the school are im Dorfant The more educational background and general informa tion you are able to acquire the better equipped you will be for your job The lo cation of your art school is im

portant It should

be near to art galleries museums industrial exhibits and established decorating centers

Travel is a most valuable supplement to a formal education. If your mind is alert and your eyes are open travel can teach you a great deal about the cultures and back grounds of other people.

To complete your formal education you will find it most advisable to serve an apprenticeship with an established decorator Such an apprenticeship will help you to determine the type of work you can do best

Having secured a good education and good training and having several his apprentice along the young decorator may seek employ ment in one of the many felds open to him liss first job might be in the decorating department of one of the great department stores. After the newcomer has gained some experience he might become a decorator is shopper—a job that is great fun as well as excellent training. Later he might be coad vanced to the position of assistant decorator and then decorator.

Experience will teach the young decorator whether his talents shine most brightly in styling home furnishings designing textiles lumiture and accessories planning displays or in the allied fields-of costume design stage settings and sales promotion projects.

You should have years of successful experience in the field before you think of opening a decorating shop of your own. In your own shop you will of course be in business for yourself and you must be sure that you have a good head for business frauming is a market as success of it. Business training is a considerable of the course of your decorating work, you will need a good deal of business knowledge but if you decorate over shop you for you for your decorating work, you will need a good deal of business knowledge but if you decode to open your own shop you



#### GRACIOUS ROOMS BEGIN WITH DRAWING



Know ug how to draw, with a good understanding of perspective is a valuable tool for the interior decorated these students are designing rooms in perfect scale and will add furnish ug details.



Bo h p c u es 'ew ho k School of in er or Decora on measurements, while the other girl sketches a possible adaptive these future decorators. Two girls take its exact measurements, while the other girl sketches a possible adaptation of the design for modera use



New Yo k School of Inte or Deco at on A swag valance is examined for its skillful workmanship Decogrators must know both how to design and how to make draperies and silp covers

should take the time to make a special study of running and managing a business

After you have had training and experi ence in interior decorating you might choose to become a designer or a consultant to man ufacturers. If magazine or newspaper work appeals to you you might write articles about your work or accept an editorial posi

There is so much variety in the many branches of interior decoration that the mind is constantly challenged and there is always an incentive for growth and achievement. The completion of a formal education in this life is the real beginning of more and more interesting study. The meaning of more and more interesting study. The meaning of more and more interesting study. The meaning study is not made as the study of th

A capable decorator is able to read and understand blueprints and layouts and he should be able to draw them himself. If he

has this skill he can make sure of achieving the exact effect he wants from the first to the last detail If he can do the actual drawing himself he will gain an un derstanding of scale line form and design which can be acquired in no other way Many of the problems of decoration are directly concerned with architecture and a basic knowledge of this subject-traditional modern -is vital to the decorator

A decorator should know how to draw plans for struc tural changes in a house or in a part of a house He might wish to have cup boards built into a kitchen or he might wish to turn two small rooms into one good sized room by removing the between partition Sometimes the addition of a fireplace will change the whole appearance of a room in such a case, a decorator should know whether or not it is practical to have a fire place made knowing how to make changes like these

is a part of the business of any skillful dec orator

Sometimes a decorator may be called upon to make sketches and plans for the manufacture of special p ecos of furniture. He should be able to super use the making of each p eco so that it will turn out to be just what be ordered. The decorator may also create de signs for fabrics rugs and accessories when be can not find what he wants on the market

A good decorator may be asked to decorate almost every kind of place where man lives or works or seeks amusement—hotels yachts stores office build ngs and theaters Or he may specialize it? he likes on all types of home decoration from city apartments to country estates

Interior decoration is one of the finest of careers that talented women can undertake and few other fields offer so many opport tuntiers for enthusiastic capable persons whether they are men or women If you become an interior decorator you will need to use all of your abilities all of your knowledge and all of your understanding



# ECONOMICS IN THE WORLD'S LIFE

By Graeme O'Geran

Department of Economics Syracuse University

CONOMICS is the practical science dealing with the satisfaction of human wants The word economics comes from two ancient Greek words mean ng household pos sessions and managing The study of eco nomics the study of our human wants and their satisfaction is based upon two funda mental truths The first of these truths as that our wants are unlimited. We are somehow never fully satisfied No sooner is one want satisfied than another appears. Take your self for example At some time or other haven t you wanted say a new ball and bat for Christmas tell ng your parents that such a present would make you perfectly happy? Then perhaps even before New Year's you found yourself thinking that you could really play good ball if only you had a new ball suit or a pair of sp ked shoes Well we are all that way always wanting something we do not have

The second great truth is that nature makes us struggle for most of the things we need or want. Your father or mother must work in order to earn the money with the tobuy the clothes you wear the food you cat and the things with which you play When you grow up you too will have to work, if you hope to satisfy your wants.

From the earliest times man a chief concern all his life has been to supply his daily needs. As a result of this struggle to make a living our ancestors passed through exertal economic stages. Their passage from one stage to another was very gradual in some cases and more rapid in others.

Man lived in the first stage f r perhaps thousands of years. The people in some parts of the world remained in this condition much longer than did others for example some or the American Indians were in this stage when the civilized white men first Inded it. America In the first stage wants were med by taking fish from the lakes and streams owned no personal property as we thin. I did today. Most of them had no permanent home and engaged in meither trade nor commerce Depending as they did entirely upon the raw materials of nature they would suffer a materials of nature they would suffer a first property and the property of person of the property of persons and the property of the

With advancing cubilization and with in creasing wants man gradually began to domesticate wild animals. The Old Testament describes a people in this economic stagsurrounded by their flocks of sheep and here's of cattle This is called the Pastoral Stage Pastoral means feeding grazing The word pasture comes from the same Latin root

In the next period the Agricultural Stage man began to own land and slaves and he learned how to raise a number of crops 50 wealth began. The people of England for example following the Norman conquest of 1056 advanced rapidly in the art of farming and some of them built up large agricultural estates.

With the growth of trade and commerce following the Crusodes in the Middle Ages agriculture came to be somewhat less important in many sections of crollaced Furope Men became skilled in making things with their hands and selling these things—cloth of various kinds shoes furniture and so on This period is called the Handicraft Stage II some day you go to I repland you will

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and that in London many of the ancient street pames remain indicating the trades of the people living there in the years of the Handicraft Stage For example you will see there such names as Mason's Avenue Iron monger's Row and Shoe Lane

You and I live in the Industrial Stage of the world's life. The Industrial Stage became firmly established as a result of the Indus trial Revolution which made it possible through many inventions, to do by machin ery work that had always been done by

human and animal labor

This revolution (or change) took place in England between 1750 and 1850 it spread to many parts of the civilized world including the United States Among the most important inventions were Hargreave's spinning tenny. Cartwright's power loom Whitney's cotton gin to separate the seed from the raw cotton—and probably the most important of

all Watt's steam engine The results of these great inventions changed the way of living for millions and the change kept spreading and is still spread ing More things could be made at less labor and less cost 'The modern Factory System came into existence Trade and commerce were extended to far parts of the earth. Then men discovered that they could accomplish more by Division of Labor about which we shall soon speak We said that economics is concerned with the satisfaction of human wants Things which satisfy these wants are called Goods The bread we eat the clothes

we wear the air we breathe are all goods

exist in great quantity relative to the demand are called Free Goods Air water and sun shine are examples of free goods Not only are they exceedingly useful they are neces sary to life itself Yet under ordinary conditions we do not pay for them since they exist in abundance and may be had for the taking

Those goods which do not exist in suffi cient quantities to meet the demand are called F conomic Goods Unfortunately most of the things that satisfy our wants are of this kind they are scarce and require effort to make them or money to pay for them

Useful services even though they are not materials or things are clas ed as economic goods The pohceman the minister the operator of a bus and the teacher all render services which are just as much \*conomic in character as those of the carmenter or shoe maker

What is wealth? We commonly talk of wealth as meaning riches the possession of much property A poor man is one who has few things or little wealth while a rich man is one who has many things or much wealth

But in economics we use the word without reference to quantity. In general we consider wealth is a group or collection of economic goods Wealth consists of all tangible things which satisfy human wants which can be transferred or exchanged and which because they are limited in supply have value in exchange

The study of economics is so much con cerned with wealth that it is often defined though not quite truly as the science of wealth its production and distribution



serican Indians fived in the Hunting and Fishing Stage longer than most peoples. Here they bunt wild buffalo



# ECONOMICS IN THE WORLD'S LIFE

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To repeat acaith is a group of economic goods It is limited in supply transferable and useful in satisfying human desires. Study this definition carefully. Sometimes very in jurious things are produced and bought and sold Often goods of inferior quality are made for a poor market Economics studies the best means of increasing the quantity of goods and commodities in their distribution It is the business of art and education to see that the wealth produced is good in kind and such as will make people happy com fortable and cultured. In the same way, when we study engineering we are concerned solely with the making of machines and not with the quality of the goods the machine will be employed to manufacture A good loom may be employed to weave a poor cloth but that is not the fault of the loom. So economics when it deals with producing or exchanging commodities treats them all as wealth

#### A ENOWLEDGE OF THE LAWS OF ECONOMICS IS IMPORTANT IN MAKING A LIVING

It is seen important if the greatest happiness is to be secured for the greatest number of people that we should understand the laws governing the production and distribution of wealth. If we do not understand these the production of wealth if we do not understand the contract of the production of t

Getting a living was very, easy to under stand in the past up to about 150 years ago. Few machines had then been invented and the things inside were for the most part manufactured from beginning to end by individual workers. In making a surf of clothes one man cut and fitted and seved and made buttoobles. He performed every necessary process. The same thing was true of almost the same than the performance of the contraction of the control of the control of the control of the congreater part of trade was carried on para process. The same thing was carried on para process of the control of the control

#### SPECIALIZATION IN THE FIELD OF LABOR HAS BEEN DIVIDED INTO FOUR FORMS

Now all that has changed as a result of the Industrial Revolution. The machine takes the place of human labor in many steps And since machines can usually work laster than human beings there is a great increase in the kinds and quantities of things produced Things can be cheaply purchased which formerly were made at home—soap for instance Workers specialize To this specialization the economist gives the name Drission of Labor which has taken four

1 Occupational Division of Labor Long before the Industrial Revolution individuals and families began to specialize in particular occupations One family would concentrate on farming another on the making of shoes another on grinding grain for making flour another made clothes and so on Then an exchange of products took place so that everyone had all the necessities of life As a result of this occupational division of labor, things were not only made better but also made more cheaply since concentration on one job increases skill in that job and speed in getting it done Thus more articles can be made in a single day or week. This means a smaller cost for labor on each article

2 Datasion of Labor settlin an Industry Then occupations began to be broken down into parts especially after industry left the home and concentrated in factories For in stance in the clothing industry, one content when the content is a stance in the content of the holds and the model and the factories of the total themselves to making women a dresses suits hats and so on Likewas specializa ton developed in professions. For instance moveday, one doctor looks after our eyes another after our ears another lafter of the we fall and break an arm

Short must be a supported by Task Still using the clother must be a next pale or find that a sign number of workers are employed in the making of different parts of a mas suit. One does the measuring another the extiting another the sewing another must be button holes and others sew on the buttons.

4 Territorial Division of Labor When

heavy machinery began to be used us England in the second half of the eightenial century another change took place Coal was needed to rust be machinery. It was wise to build factories where coal was abundant so that the fuel would not have to be hauted for long distances. The areas without coal raged in agroulture and bought our first the result of the second properties of the second stricts. For various reasons other districts specialized in different trades For example. Beliast in Northern Ireland made linens because flax was grown near by In the United States, the steel industry developed in places near coal yet close enough to water ways so that iron ore could be brought cheanly to the coal for smelling. In Albanna isly the needs of its people without looking outside its borders (or the borders of its

Allies)
Adam Smith an Englishman laid the foundation for our modern study of economics His great book. The Weatern op



In the Pasteral Stage man began to domesticate and herd wild animals



The Be mann Collection The Agricultural Stage saw man turn to cultivating crops with tools such as the crude plow shown in this picture

coal and iron are found close together that is an ideal situation. Cotton mills are found in the southern states, where cotton is grown

5 International Di ision of Labor There is a division of labor not only among persons among trades and among districts but also among nations. This arises for exactly those reasons which cause different trades within a country to be carried on in different parts of it A country may specialize in an industry because of certain natural resources or cli mate China's silk industry grew for example because the climate was just right for mulberry trees to thrive and sill-worms eat mulberry leaves The people of a country may develop a special skill and so an indus try will grow there-as, for instance watch making in Switzerland and face making in Belgium

For these reasons the nations of the earth are becoming more and more dependent on each other. To encourage this speculization and the exchange of goods between countries two great meetings attended by representa threas of many nations were beld in 1944. One was at Bretton Woods. New Hampshire to make plans for post war trade and com were and the other at Dumbarton Oaks. Virgina to plan for a listing peace.

All wise men know that specialization be tween nations is good only in time of peace In wartime each nation must strive to sat



Nations was published in 1776 It describes three advantages arising from the division of labor

The increase in dexterity and skill of each particular workman 2 the saving in time because a workman no longer has to



thing to another if the worker has to make the whole of an article or to employ different processes and materials, there is necessarily much time wasted in laving down one job or one tool and taking up another, and clearing up after one tob and preparing for a different kind of work

To illustrate how the division of labor leads to invention Adam Smith told the following story of a boy who worked at a steam

boy was constantly employed to open and shut alternately the communication between the boiler and the cylinder according as the piston either ascended or descended

One of those boys who loved a play with his companions observed that by tying a string from the handle of the valve which opened this communication to another part of the machine the valve would open and shut without his assistance and leave him at lil erty to divert himself with h s playfellows

One of the greatest improvements that has been made upon this machine since it was invented was in this manner the dis

Sheemsking in olden times done by hand Here a ler (shoemaker) works

By E≠ ng Galoway New Yok machine atitches about at

pass from one job to another 3 the stimula tion of invention As to the first of these every child has

experience To become expert in swimming or in playing the piano we must give much time to pract cing The constant practice of a particular thing makes it become second nature Thus the person devoted solely to one occupation is far more useful than if he

As to the saving of time in going from one

covery of a boy who wanted to save his own

labor Adam Smith is even more right on this point now than when he told this story Nowadays in great manufacturing establish

ments there are much nes to do almost every part of the work quickly and with a mini mum of attention from the operator

Along with the great advantages we have were a jack-of all trades seen resulting from the division of labor there are some results that are far less de-

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sirable. One of the chief of these is the monotony which comes with doing one particular task or watching a machine do one small task day after day and year after year, maybe for a lifetime.

Such tedious work produces a deadening effect upon both mind and body and may cause an individual to lose interest in the job Such concentration can not help but destroy pride in master workmanship

The remedy for the monotony is to be found in shorter hours of labor which give the individual a chance for recreation or for some form of individual work or hobby

It is true that hours of labor have in gen eral grown shorter as the machine age has grown older

#### HOW WEALTH IS CREATED

We are now ready to take a closer look at wealth What is wealth? That has been defined as a collection of things limited in supply transferable and useful in satisfying humin desires. We may go further and say that wealth to most of us means possess on of things over and above the account needers have a compared to the country that the country has possess on the country has potential or unsued wealth if enough of the people have a good store of sound money or other possessions. A country has potential or unsued wealth if it has stores of minerals or forests or other gilts of nature that have not yet been worked.

Wealth is created through what the econ omist calls the process of production Production takes place when a commodity is shaped into a desired form taken to a place where it is wanted at a particular time and purchased by a consumer who believes it will satisfy some particular want. For example the wheat farmer raises the grain the miller changes it into a useful form-flour-the railroad carries the flour to a place where it is wanted when it is wanted while the mer chant performs the service of getting the flour into the hands of the baker or the housewife who converts it into bread for im mediate consumption. All these people are producers So you see that anyone who makes a commodity more useful is a pro ducer. If in doubt as to whether any person, is a producer or not just ask the question is someone willing to pay for the product he turns out or the service he renders? If the answer is yes then he is according to eco nomics a producer

From the beginning of time man has se cured a living from the soil For ages even to exist meant a continuous struggle Ex



An apartment house owner is a producer of a service

istence was possible through the combined forces of two productine factory or agents—nature or land and human labor. With the long passing of time a new and very important factor in production appeared—capital Later as the Industrial Revolution spread from Europe to other parts of the world a fourth factor became very important. To this new factor is given the name enterpriser. Now let us see the part played in production by each of these factors and why each is so important in modern economic life.

i Land or nature is that which provides use with standing froom in which to work and play materials and forces. In the science of economical hand means far more than just soil. It includes as used in this broad sense everything above the earth as air every things upon the earth as soil trees rivers and may took and a minerals. When we include in the control of the

2 Labor By labor as a factor of production is meant the application of our mental and physical powers to the materials and forces of nature in the creation of economic goods or wealth

Labor is usually considered as of two kinds physical and mental The physical workers are likewise divided into two classes. the unskilled as the pick and shovel worker, and the skilled worker, as the shipbuilder,

boiler maker and automobile mechanic There are also two groups of mental work ers First, the routine worker, such as the

average bookkeeper or store clerk Second, there is that much smaller though very im portant, group known as the intentive class of labor. To this class belong the expert ac countant the store manager and your school principal as well as such men as Eli Whit ney, who invented the cotton gin and Thomas Edison

### WEALTH TENDS TO GROW BY SAVING LABOR AND BY INCREASING ITS EFFECTIVENESS

It is not the amount of labor we do which creates wealth but its effectiveness. Man is a small creature much weaker than many of the higher animals but his muscles are directed by his wonderful brain. It is a common error to speak of labor as the source of wealth. The truth is that all the labor in the world would be of little use unless it was used in co-operation with the other factors of production-land, capital and management. It is equally true that wealth increases, not by increasing labor, but through saving labor

As long as man worked with his own hands or with the aid of a few simple tools and weapons he spent nearly the whole of his life in obtaining a scanty supply of food No matter how rich the territory he inhab sted he could not become wealthy or ensoy much comfort or culture A striking example of this is the United States which supports about 140 000 000 people Not very long ago in the world's history, this territory with all its wonderful wealth of rich prairie land. timber, fine rivers natural ports and mag nificent stores of animals, was the home of a small number of men, most of whom hunted or fished or scratched for a scanty living and failed to create wealth because they did not know how to make the best of the natural gifts about them

#### THE INVENTIONS AND DISCOVERIES OF ALL HISTORY ARE THE WORK OF BUT A FEW MEN

But when labor is aided by the inventions and discoveries of clever men and exercised in a properly organized way, the possibilities of wealth production are almost unlimited We of today are very fortunate we are the heirs of all the ages-the inheritors of the work and genius of every great man and woman of every nation We have a greater concretunity than ever to create more wealth

Now here is a remarkable thing The great inventions and discoveries in history have been the work of a few gifted people Even if we include the small inventions, the number of people to whom we are indebted for the modern means of making wealth amounts to a tiny fraction of the billions who have lived on earth 11 we are ever tempted to be proud of using such inventions as the electric light, or the railway train, or the steamboat, or the radio, let us remind ourselves that we did nothing to bring them about and that we can at least use them intelligently

We have seen how labor is divided among individuals, among trades, among territories and among nations in such a way as to get the best results. By organization we can make ordinary people as effective for many purposes as if they were very clever indeed while we can raise the value of all the people concerned, whether individually clever or

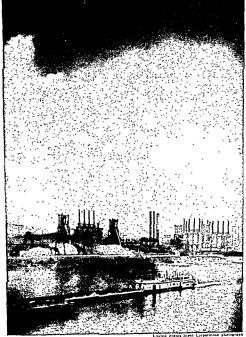
### THE FRUIT OF ONE MAN'S INVESTIONS MAY ENABLE MANY MEN TO WORK MORE CLEVERLY

Suppose a man invents a tool If he re mains the sole user of the tool, the value of his clever brain is confined to the one pos sessing it, himself If however, he shares the secret of his tool with others, each one who has it at once becomes a clever worker, by use of a tool be could not have invented for himself. So men become, as it were, clever at second hand

3 Capital is produced wealth used in the production of other wealth From this defini tion it can be seen that all capital is wealth but that all wealth is not capital I and is wealth but certainly it is not capital. That is because land is not produced, it is a gift of nature Capital is the result of human effort, requiring both waiting and sacrifice

The following story may illustrate what we mean In early times a man might have kept his family fed by fishing all day long with hook and line But one day he might have taken time to build a net, while living on half rations for the day Going out the next morning he would find that within the space of a few hours, by means of the net be could catch far more fish than he had caught previously by working all day Through sactifice and waiting capital was created in the shape of a net. The farmer who puts aside a portion of one season's income in order to buy a new plow is creating capital in the very same way He buys the plow in the be-hef that spending his money for it will result in increased production

### THE TERRITORIAL INFLUENCE IN INDUSTRY



Capital has vastly aided human progress. We have een how inventions have multiplied the powers of man making men een if not clever themselves the users of clever things. It is important to understand however that if someone did not take the trouble to store up capital in the shape of machines and in struments (inventions) the inventions could not be used.

Suppose someone invented method of extracting from shining white metal alu which it contains. That deed be a tremendous serv a cheap clay the minum would in ventors improved upon the basic designs and millions of people every year ride on the radroads. Many enjoy the inventions of a few

Act no matter how elever the ideas the railroad could not have been if some people had not stored up money to manufacture locumotives and trains to erect buildings to hold engines and crars when not working repair shops, tracks and tree and offers in which to control the whole undertaking These things form the capital of the ruitroad They embody the inventors ideas Once more we see that labor becomes furtiful when

Con tay of the F1 M Andahara

Cou tesy of the Pa he Exchange
An Exhibit a tance represents one of the chief elements of his private capital. His sledge and eage are others.

mankind because aluminum is not only beautiful but useful Such an invention would make a very great difference to the powers of men and we could employ aluminum for a thousand new purposes. However, the new process could not be used unless somehopy found the means to set up the meentor's clever machinery. Sorreone must find the capital to utilize the new invention or the anienton does no ecod.

Intention does no good

Left us consolved them in which has passed

Left us consolved mean in which you have

A train it is marvelous thing though not of

A train it is marvelous thing though not of

us are so familiar with trains thin we feel in

stonowhment at seeing a great locomotive

drawing a long procession of cars over the

rails A number of cleve brains thought out

the deas which are used in making a modern

train Stephenson invented the railway en

grow Westinghous instricted nearest of check

Pullman gave us the modern duning and

seeping cars Perhaps a hundred other in

capital makes it possible to put inventions to work

The Eskimo's sledge his dogs his canoe his knife are his humble capital or stock These are the result of his careful saving and if he did not thus save he would perish. The principle is the same in civilized, commit nities We have learned to exchange goods with each other by means of money By money we measure the value of things by a common standard and money enables civi lized men to save up work in a convenient way Money acts as a storer of value Instead of saving up hats if we make hats-or auto mobiles if we produce automobiles we can save up money The money we can either use ourselves or lend to others to establish stocks of capital with which to use inventions and to enable persons to be usefully employed in working on inventions

Thus sating becomes very important for without it all the clever inventions of ma chines and appliances would be useless. It would have been in vain for Watt or Stephenson to invent the locomotive if people had not been found willing to lend money to make enough engines to run a radiroad It would have been in vain for men to invent radio if enterprising and saving people had not come forward to put their money into broadcasting stations and equipment, through which programs are brought into vour home, and may reach every corner of the world Now we see clearly what capital is It is a stock of produced goods resulting from saving and if no one saved, there could be no capital

The person who saves and owns capital is sometimes called a capitalist. He may be either a man who has saved to form a business which he himself will organ ze or may be one who, having nothing to do with the business himself, has lent the money reourred to buy the machinery, estimment and

that production might be properly carried on The enterpriser assumes the risks for the success or failure of the business He must make the decisions as to the amounts of land labor and capital necessary in a given plant or industry.

or industry

This co-ordination of factors may be more clearly understood by studying a large cor poration, as for example a great telephone company. The wires switchboards and build imps represent the capital The land provides the space for buildings and equipment. The managers linemen and opcrators represent the labor factor. The stockholders and their chosen officers constitute the enterprisers upon whom the final success of the industry rests. They are the ones who receive what profits are made, and they are the people-who must shoulder any losses.

This illustration should make it clear that no one factor in production is more impor-



An automobile assembly line illustrates the age infirstion by task method. A man does only one particular job

raw materials needed to run the business

4 The enterpriser is the fourth factor of production Before the Industrial Revolution the factors of production were not separately owned One man owned the land and provided the labor and the expend to early on his business. Most of what a family consumed was produced within the home Problems of labor and capital were absent

However, with the coming of machinery, one person came to have labor to sell, an other land to rent, and still another capital to invest. These factors were unorganized until the enterpriser, or business man as sumed the task of unitying them in order

tant than any of the others. No industry, can carry on without the combined factors working together smoothly and in proper proportions. Any attempt to place greater in portaince upon one factor, as for example, sapital, or labor, would be about as difficult as to try to determine which cutting edge of a pair of sciesors does the cutting or which leg of a time legged stool is most important

As we have discovered, the enterpriser is a man with imagination He recognizes a business opportunity neglected by others He may be a Ford who first saw the importance of a low priced automobile, a Firestone who developed the rubber industry, a Woolworth, who recognized the opportunities in five and ten-cent stores or perhaps your father who was the first to sense the need in your home town for mother bank a new store or a particular manufacturing plant.

### THE BUSINESS UNIT MAY BE SOLE OWNER SHIP PARTNERSHIP OR A CORPORATION

No matter what the teld of activity, the enterpriser is successful if he succeeds in producing a commodity or rendering a service for which the people are willing, to jay a price high en ugh to return a priod. He is the one who organizes the productive factors into what the com mist calls a business unit which his as its purpose the mixing of profit through the invoduction of wealth.

The business unit may take any one of three forms (1) the sole proprietorship (2) the partnership or (1) the corporation

I the tote proportion that exists when one person examines manages and takes full re-possibility for the success of failure of the business. He must provide the find and the capital have the lation and direct all the productive operations by fair the previent numbers of the proportion of the capital invested in the proportion of the capital invested in business and the number of laborers employed in the Latted States.

#### SOLE PROPRIETORSHIP IS POPULAR BECAUSE IN THIS CASE A MAN IS HIS OWN BOSS

The very fact that the sole proprietorship is easy to organize has made it popular There are no complicated legal requirements to be fulfilled or payment of heavy fees to the state The sole proprietor also knows that the hurder he works the more he is likely to earn and that all the earnings go to him There are no partners or stockholders with whom he must share his earnings Finally there is no red type connected with the opera tion of the business Suppose for example, one of your neighbors owns and operates the leading clothing store for men in your community. He is perfectly free to buy as large or as small a supply of suits or shirts or ties as he wishes. He may spend money for advertising as he thinks best extend credit to customers or require cash open and close the store at will and even go out of business solely on the basis of his own judgment. In short he is his own boss

He does however face some serious dis advantages. In case the business fails he is held hable for all the debts. All his personal savings and possessions may be taken over to pay rent and waget that are oned and for the merchandise he has bought from the wholesalere Another disadvantage as the difficulty of getting together large amounts of capital Rarely can a business man by him self-secure subneit funds to enther business handlery when competition is keen of in periods of digreession when reverse are returned to the control of the control of the control when trace falls off and not enough money, is coming in to meet his current costs of stanier in business.

2 The pointership A partnership exits when two or more persons by mutual agree ment organize manage and assume the ricks of business I its customary, for those forming a partnership to draw up a written agreement setting forth the terms upon which the business will be run the amount of money or capital each will put if not and how the future profits are to be divided up among the partners.

# BOTH MEMBERS OF A PARTNERSHIP ARE RESPONSIBLE IN THE EVENT OF FAILURE

This type of business unit has certain adantages over the single proprietorship. To start with it is easier to get the necessary capital. Where two or more business menjoin together in a business undertaking they are usually able to poil a much larger amout money for business purposes that one of the money for the surface of the properties of the adaptive that comes from poing, their abilities and judgment You know the old Saying. Two heads are better than one."

saying Two heads are better than one of a partnership appears when such a business returner shall free rach one of the partnership then each one of the partnership them the state of the three of the partnership the state of the state of the state of the state of the debt of the state of the debt This could of course completely ruin a person and place on his shoulders a debt which could prove a lifelong burden. The partnership is propular as a form of

business orgunization with small merchan dising firms in the trades and among doctors and law-ers. The next time you go downtown look at the signs above the shore and offices you pass. No doubt you will be surprised at the number which read something like this. Smith and Smith Hardware Store. Jones and Brown Grocery or Graham and Hirsh Lawyers.

3 The corporation Most large businesses

and many small ones prefer to organize as corporations A corporation is an imaginary or artificial person created by law for some particular purpose That is under the law the corporation has the same rights and privaleges as does an individual The persons who own the business are not the corporation but merely represent this legally created individual, and carry out the rules and regula tions which the state grants the corporation at the time of its creation. The privileges are granted in the charter which is received from the state in which the business is more porated.

The corporation raises money for organizing and carrying on a business in two ways. First, through the sale of stock which is a share or interest in the corporation If for example, your father should buy a share of stock in the telephone company, or a local bank or factory, he would receive a receipt for the mone, he had This recent would be

GROCERIES

terest at regular intervals usually twice a year Most large corporations at some time or other use this method in order to raise additional money for carrying on the business National governments also use this method to secure funds when more money is needed to carry on the government than is raised by taxes

The corporation form of business organization enjoys several distinct advantages the most important of which is limited liability. This means that if the business should fail



John Brown is the sole owner of the first business unit and a partner in the second. The third is a corporation

a piece of paper stating the number of shares your lather bought on a certain date and bearing his name as owner Such a receipt is called a stock certificate. Ask your father if he owns such a certificate, if he does ask him to let you see what it looks like

When a corporation makes good profits a part of this money belongs to the owners of its stock certificates who are called stock holders. It is distributed to them according to the number of shares they own. These distributed profits are called dividends. When a corporation is not making money, there are no profits and so there will be no dividends. If the corporation fails the shares will be now finabling et all and the owners of the shares will lose all they have invested in them.

Many people do not wish to risk their savings in the purchase of stock. For them a much safer investment is offered in the form of bonds. A bond is a note of a corporation given in return for a toan of money, pledging to return the money at a stated future time, and also acreaging to pay a certain rate of in

the loss to any stockholder as limited to the amount invested He can not as in a partner ship be compelled to make additional pay ments in order to meet any outslanding debts Another advantage is to be found in the ability of the corporation to gather to gether much larger sums of money for organ izing and operating the business

An excellent illustration is provided by the American Telephone and Telepaph Company Its capital investment amounts to many millions of dollars. Yet to share in its profits a person need buy only one share of stock. This shows how a large number of people may each place a small amount of money or a corporation and so create a large capital fund with which to do business.—

The major disadvantage of the corpora ton is that the holder of a share of its stock must assume the risk of losing what he paid for it This is the chance he takes Over and against this risk of course is the possibility that he may receive ever Junge profits. Under a person can afford to lose his investment he should not purchase stock.

We have just seen how the arrangement of the factors of production in such a fashion as to make them fruitful is a very important thing and not every one has the gift of happy arrangement We owe a good deal to these enterprisers who can organize and put into

work the best processes and inventions Organization and invention between them save work and in saving it set labor free to

do other work. This is a most important economic truth For its neglect we pay in poserty and distress Let us think of a hundred people working on an island and entirely dependent on their own labor If the labor of all the hundred is needed to find enough food to keep them

alive that food is their sole wealth. They can possess nothing more because all their efforts are needed to feed themselves and they must eat or die Therefore in such case they can not have clothes or houses or fur niture or any other comforts But suppose clever ones among them in

vent good weapons with which to huntweapons so effective that only fifty people are needed to feed the hundred islanders. In that case the work of fifty food-getters is saved and therefore fifty persons are set free to do other jobs. The fifty being freed can set to work to construct buts and make gar ments The little community becomes richer not because more work is done but because a particular form of work has been saved

Suppose the fifty remaining food getters by further inventions become twenty five Then twenty five can produce the food needed by the hundred islanders and set enty five are free to do other work. The islanders become richer because work has been sated

### IT IS ONLY BY SAVING WORK THAT WEALTH AND EMPLOYMENT CAN BE CREATED

This process of sating labor is just as true in a great nation as on the little island we have imagined A nation can become richer only by means of organization and invention continuously setting labor free to do fresh work That is why the idea of making work is a fallacy-a deceptive thing Sometimes workmen are tempted to think that if they spin out a piece of work or refuse to use a labor-saving machine they will make more work for others The very reverse is the truth. It is only by saving work by using inventions as freely as possible that we can make things better for other people. He who makes work in the sense of taking an un necessarily long time to produce a thing

makes poverty. He who saves work in the sense of producing as quickly as possible and as much as possible with the least amount of labor expended creates wealth and more employment

### TECHNICAL IMPROVEMENTS MAY CAUSE UNEM PLOYMENT BUT IT IS USUALLY TEMPORARY

It is quite true that a machine which saves labor may throw men and women out of work for a time This is sometimes called technological unemployment which means that people are unemployed through no fault of their own Other work for them may not be found at once and this may cause con siderable suffering. This is especially true if inventions come very rapidly in old industries and no new industries arise at once

Fortunately technological unemployment is usually temporary. In the long run inventions open up new opportunities for workers not alone in manufacturing but in other oc cupations as well For example back in 1900 about one million persons were employed in jobs closely related to the horse and buggy However with the com ng of the automobile the carriage and wagon makers the local blacksmith harness maker and feed store owner were put out of business. These were examples of technological unemployment. But as a result of the rapid growth of the automobile business by 1938 those engaged in producing selling and servicing the automobile employed almost 6 500 000 persons Likewise throughout this entire period rapid technological strides were being made within the automobile industry itself. Instead of destroying jobs they created many new ones. This is but one of many examples that you may discover to show that by the use of labor saving devices both wealth and em

ployment are increased Thus we have examined four things which we speak of as Land Labor Capital and the Enterpriser, the four chief factors in the production of Wealth Land as covering all the gifts of Nature which man may either use or neglect Labor, as covering all human el fort Capital the saved stores without which our labor is in vain and the Enterpriser who gathers the other three factors together and puts them to work in the proper proper t ons so that they may produce most effi ciently Because these factors of production have worked together so efficiently over the years the people of the United States and Canada have more wealth and a higher standard of living than those of almost any other country in the world



Troops of the 3rd Armored Division U S First Army in Cologue Germany Background Cologue Cathedral.

# \*\* EUROPE \*\*

THE year 1945 marked the final 1 bera tion of Europe from max rule. The Germans had reached the height of their power in September 1942 when their troops stood before the Russian city of Stalingrad on the Volga River Norway Denmark Bel gium Luxemburg the Netherlands France Poland Czechoslovakia Vigoolavia Gerece and Vistria lay prostrate at Germany's feet (Czechoslovakia and Austria had been occu pied before the beginning of World War II) Russias 5 justion was desperate in 1942.

Italy Hungary, Bulgaria Rumania and Probland were Germany, a Osedront allies Of the neutral states "Spain and Portugal were facust countries and freedly to Ger many. Democratic Warden and Switzerland bermed in by the Axis were helpless. Live (Ireland) was determ ned to have nothing to do with the war Flushed with success the Narus openly boasted of the New Order that they would brane to Europe By the beginning of 1045 Germany 8 hold over Europe had been broken Four of her all es—Haly Rumania Bulgaria and I'ul laid—had been forced to surrender The Russ ans had penetrated into Poland and Cechoislovakia in the east and I ugoslavia in the south British troops had occupied Greece. The Allies had driven the Germans lock to the salley of the Po River in Haly in the west almost all of Brance Religion to the west almost all of Brance Religion to the west almost all of Brance Religion of the Netherland, had been freed from the of the Netherland, had been freed from the grip of the Netherland.

Germany s cause had been pounded mer clessly from the air by buge fleets of Ameri can and British bombers. Large areas of Berl I Leptz Essen and other large cities lay fin ruins. Germany's war industries had been battered ber transportation system had been seriously damaged Albrendy love fried Line, the main nair unfersive barrier. THIS WAS THE IEGFRIED LINE in the west had been cracked at several points the great cities of Cologne and Aachen were in Allied hands

The Nams had launched a last desperate counter-offensive in December 1944. They had plunged through a weakly held part of the All ed line and had advanced deep into Belgium and Luxemburg. But this fetce at tack had been stopped at Celles near the Wesse River The Nams had held up the All led advance for a time but they had ex hausted their own reserve strength

As 1045 opened German advance units were still deep in Belgium The Alles now brought up fresh reserves and overwhelming air power By the middle of January the mazi troops, were fleeing eastward under a perfect hail of Allied fire to the shelter of the Stegfired Line

The British and Americans now continued their invasion of western Cermany By the first week in March sheet Alliled armies had reached the west bank of the Rhine River The Germans began destroying the bridges across the river It seemed certain that Rhine would be a formidable barrier A FAMOUS CROSSIFG-INE HINDERGROUPS A FAMOUS CROSSIFG-INE HINDERGROUPS

BRIDGE AT REMACES MARCH #

Vet it dd not hold the Allies back very long On March 8 an American force crossed the river at Remagen over the Hindenburg Bridge which a careless officer had failed to blow up The Germans rushed reserves to the Remagen area But in 50 do ng they weak ened their defenses elsewhere along the river.

On March 24 the British Second dray of the VerOn March 24 the British Second dray of the March 25 the British Second dray of the March 25 the March 26 the Marc

In the mentions the Russian steam rolls for the mentions of the reast by a ground alread steadily in the next by a reader to the reast by a reader the German of Russian as more of She sia At about the same time another array had stormed into East Prussia Russian troops kept up steady pressure against the Hungarian SA that on January 20 Hun garv Germany's last ally had to sgn an armstuce

The Russians continued to advance all Canad an A my O c seas pho o Canadian truops driving over deeper into Cormany showed the r sense of humor when they put my a sign of their own on the far famed Singrited Line

EUROPE

along the line from East Prussa to Hungary where fanatical German forces still kept up the struggle. One after another Germany's strongholds in the east were overcome. By the beginning of April the Russians had reached the mouth of the Otter River they had advanced far into Siesia they had driven across western Hungary and they stood at the Austran border.

In the month of April Germany was crushed by repeated hammer blows from the east west and south The Russians invaded Austria and captured Vienna on April 12 3 week later they fought their way into the heart of Berl in gradually overcoming the stubborn resistance of the defenders

American tanks reached the Elbe River only severly mules from Berlin' on April 1r. The famous Third Army under General Pat ton entered Germany on the 18th cutting Germany in two One big German city after another—Hanner Weimar Leping Stutt gart Bremen Uminch fell to the American British and French muders Germanyas, cut up into a number of pockets each more or less solated from the others.

The Allies launched an offensive in north ern Italy on April 9 and by the end of the month the Germans in that area were in full retreat They had to abandon Verona Genox Villan and bence At this moment of Albied trumph the former Italian dictator Bentio Mussolini was captured by Italian guerrillas He was put to death on April in the village of Dongo on beautiful Lake Como Few people mourned this boatiful man who had brought disaster to his native land

On May 1 the German radio at Hamburg solemly, amounced the death of Adolf Hit let 'tcording to this broadcast the German dictator had ded in h s capital city of Ber In bravely leading his troops Many people refused to believe this report it was rumored that Hitler had fled—perhaps to Spain per bays to fortural perhaps to some place of refuge in the Western Hemisphere It really band.

Berlin fell to the Russans at last on May 2 on the same day the German armes in northern Italy and southern Austru—a total of a million men—gave up the fight Two days later the British accepted the surrender of the German troops in northwestern Germany Denmark. Helpoland and the Frasan was the surrender of the German troops in northwestern Germany Denmark. Helpoland and the Frasan was also succeed Hilder appear the central of definite surrender ofucially end in gressit and succeed through the Germany X E 384—the Same May 1 of the Same All Same Allondon Sam



Canad an Army Ove sees plan

With this surrender at Wageningen, Halland the Cormans in western Helland capitalated to the Caundina.



ning of peace some 300 000 of the to B Alps. These GI s are taking their day of victory in Europe-had come at last

The European continent had suffered ter ribly from six years of war. The countries that had been occupied by Germany and her allies had had a bitter taste of the New Or der The Nazis had slaughtered great num bers of innocent people. Mailiens of men and women had been dragged from their homes and had been forced to work as claves in Germany s war industries. The Germans had looted the occupied countries they had left inflation and want behind them The 1x13 countries had not escaped the

horrors of war Years of relentless hombing by British and American planes had left their mark so had the Allied invasions in the east and west Large areas of Berlin Hamburg Cologne Essen and other German cities lay in ruins Italy Hungary Bulgaria and Finland also bore the marks of Allied air raids and artillery fire The industries and transportation systems of all the Axis countries had been hard hit

There was great political confusion too. in Europe as the war came to an end The Allies had not adopted a uniform policy that would apply in all the countries freed from the \u213 Great Britain and the United States had agreed that the territory occupied by their troops should first be ruled by a British American military body called the Ulted Military Government (AMG) As soon as possible the civil administration was to be turned over to a provisional national government in each country

Russia was not represented on the AMG she introduced her own policy in the terri tories conquered by her armies. To be sure in some of the countries occupied by Allied troops there were Allied Control Commissions on which all the principal allies were represented But it was a common complaint that these commissions did everything but matrol Governments favorable to the Russians

were set up in Finland Bulgaria Rumania and Hungary-all former partners of Ger many -as well as in I oland Czechoslovakia and Yugoslavia which had been conquered by the Sazis Some of these governments were dominated by Communists who did not represent a majority of the population

Even before the coming of VE Day, dis agreements had arisen between Russia and

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ber allies over these governments. Russia s allies complained that she had disregarded the rights of the Polish and Yugoslav gov ernments-in exile which had directed the fight against the Axis from London They protested against Russia's policy of prevent ing her allies from finding out what was going on in the countries that had been occupied by Red Army troops

For her part Russia pointed out that all had not gone well in some of the countries occupied by Great Britain and the United States In Italy the occupation authorities refused to let the Italians set up a republic British troops had been employed to put down tevolts in Greece and Belgium. The Russians complained that people's movements in these countries had been crushed and that her allies had favored conservative groups

Several months before the end of the war in Europe, President Roosevelt of the United States Prime Minister Churchill of Great Britain and Premier Stalin of Russia met near Yalta in Russia's Crimean Peninsula Among other things they discussed the grow ing misunderstandings between Russia and her allies. In a statement issued on February 12, 1945 the three leaders announced that they had agreed to adopt a unified policy in

They discussed rather vacuely the trouble some matter of Allied control in the coun tries that had already been occupied But they set forth in considerable detail their plan for the administration of Germany after her surrender. The country was to be divided up into several zones or districts and these would be occupied by the principal Allied powers The Albes would break up the Ger man general staff abolish the Nazi party punish war criminals and remove or destroy all industrial equipment that could be used for war production

The results of the Crimea Conference encouraged the Allied peoples, for it seemed to show that the Allies had come to an agree ment at last V E Day came the war in Eu rope was over. But the day of victory was darkened by continuing quarrels between the Allies Great Britain and the United States were still not satisfied with developments in Rumania, Bulgaria Hungary and Yugo



5 gnal Corpe photos e Big Three at Potadam Germany Aberer Stalls Treman and Churchiti amite in friendly fashion Below manu's back is turned toward the camera. Charchill and his aides are at the left. Stalls in seated at the right.



B tah Informa on Serv ces Prime Minister Attiee annunces Japan a surrender slavia which the Russians dominated Russia objected to the Allied policy in Italy and Greece

On July 17 President Truman Premier Stalin and Prime Minister Churchill met at Potsdam near Berlin and began a new se trees of conferences Churchill was replaced on July 28 by the new British prime minister Clement R Attlee On August 2 Truman Stalin and Attlee issued a joint statement, which was called the Potsdam Declaration

which was called the Potsdam Declaration
The decharation outlined a general poley
for the handling of the German problem fol
lowing pretty tooley the plan alrendy presented at the Crimea Conference It dealt in
far less detail with the other occupied countries II expressed the puiss hope that Allied
newspaper men would be permitted to see
what was happening in Rumania Hungary,
Bulgaria and haland

Digital and Finland Visinderstandings between Russia and her allies continued Some statesmen thought that this was because no official peace tract that the same because no official peace tract specific peace to the state of th

cal Indeed it appeared to have caused bitterness among the Allies

Another effort was made to bring them together in December 1945 when Secretary of State Byrnes of the United States, For eign Minister Molotoff of Russia and For eign Secretary Bevin of Great Britain met in Moscow At this conference it was agreed that the Big Three-the United States. Great Britain and Russia-would draw up peace treaties with Italy Rumania Bull garia Hungary and Finland They would then submit these treaties to a peace con ference that would include all the powers that had fought on the Allied side The Mos cow meeting represented a step forward Let at the year 1945 drew to its close there was still no unified policy for the settlement of Europe's problems

# IN MANY COUNTRIES THERE WERE IMPORTANT POLITICAL CHANGES

Let the countries of Europe did not mark time in 1945 or patiently wait for the All es to become truly allied There were important

political developments in almost every one of these countries. Let us briefly survey these developments

Few nations suffered more in the war than Russia none came out of it will greater prestige. The soviet system of government had triumphatly stood the test of war De spite the destruction caused by the nazi in vasion, the Russian people faced the future with confidence. They were enthiusastic about a new free-year plan for 1964-1950-a plan intended to create a greater industrial Sowiet Umon than existed before the war.

### THE LABOUR PARTY CAME INTO POWER IN GREAT BRITAIN

Great Britain underwent a major political change in 1943. On July 5 the country held its first general election since 1945. The Britain briefs went to the politic on that day Britain briefs went to the politic on that day The Labour party, won an enewbellings to try in the electrons oldnaming a majority of the seats in Parlament Frime Minister Churchill who had been in office sent May the Churchill who had been in office sent May the Churchill who had been in office sent May the Churchill who the Churchill who the produced of the Majority of the Churchill who men to the Churchill who men in the electron He amnounced that he ment in the electron He amnounced that he

intended to remain in that body as a leader of the Opposition to the Government. The new government announced plans to nationalize (set up government ownership over) certain industries which are of vital importance to the country as a whole These include the iron steel coal and electric in dustries. The Bank of England was also to

be nationalized. Other industries were to be permitted to go on under private ownership

The nationalization program proceeded slowly in 1945 A bill to nationalize the Bank of England passed the House of Commons in October, but the bank was still in the hands of its owners at the end of the vear. There were various reasons for the Labour Government's slowness in pushing the socialization of Great Britain For one thing the country was exhausted after six years of total war, and it was feared that too rapid socialization might bring about a crisis

Then, too, the British faced many diffi culties abroad There was trouble with India, which sought immediate independence, and in Palestine, where Jews and Arabs were in conflict. British troops were called on to intervene in the Netherlands East Indies. French Indo-China, Syria and Lebanon (See Asia ) In general the Labour Government carried on the policy of the conservative governments of the past-that is, it upheld the interests of the British Empire throughout the world

France, which had surrendered to Ger

recover her former position as one of Eu rope's foremost countires General Charles de Gaulle, who had never given up the fight against the Axis, had helped to set up a Provisional French Government on August 15 1944 Linder De Gaulle's inspiring lead ership this government sought to bring about units among Frenchmen It enjoyed wide support yet some Frenchmen criti cized it because it had not been put in of fice by the vote of the people

On October 21, 1045, the voters of France had their day at last. They voted over whelmingly to create a National Constituent Assembly, which would draw up a new constitution. The three most important groups in the Assembly were the Commu nists, who formed the largest single group the Socialists and the Popular Republican Movement a new party made up of liberal Catholics These three groups formed a co alition which won control over the Assembly

The Assembly unanimously elected Gen eral de Gaulle president of a provisional government that was to serve for a period of seven months During this time a new constitution would be drawn up. The nation



me Ring Hanken VII on his return to Borway or Prince Hernis, Princess Bagabile Crown Prince be royal family groves the crowds that gethered to wok: Latt to right: Princess Aprils Crown Princess Mariba

accept or reject the constitution

The French took steps in 1945 to punch those of their leaders who had norted with the enemy Marshall Henri I hilippe Petain bead of the Vehy French Goweiment which had been set up after France's surrender was sentenced to death for treason ( intelligence with the enemy ) on August 195 In view of his age the sentence was commuted to his impresonment Pierre Laval former premer of the Vehy Government abos received the death preside and the was about on October 1st N number of other das bottom Contachens were extensed to determine the presenting of the Petrol Petrol

### GOVERNMENTS IN EXILE AND WHAT BECAME OF THEM

Some of the occupsed countries nent back to the old not writness at a first hand to the old not be not to the old not be not to the old not be not a first hand to the Netherlands and Grand Duchess Charlotts of Luxenhurg had castalished governments in-cule they were welcomed back by their peoples. The Cresh coloval, Goorenment in Exile headed by Eduard Benes, also return ed to poner. In grant the Cresh and the Constitution of Demarks had remanded in his native land during the naze occupation. But the Danes, were glad to acknowledge him after King when the Germans were driven that real me the Germans were driven the control of the

The situation was different in the other occupied countries As the year rodg opened the Polsh Government in Eule found itself barred from its native land much of which had been recaptured from the Cermans by the Russians. The Government in Eule which had its headquarters in London was backed by Gorat Britans and the United States The Russians supported a provisional Conference of February 1945 to try to the Conference of February 1945 to try to bring the two opposing groups together

#### A NEW GOVERNMENT FOR POLAND WAS RECOGNIZED IN JULY

On June 23 a new Polsdi government was formed with Edward If 'Gubba Norawski as premier It consisted mainly of members of the Lubi'n group though the Government in Exite was also represented. The new government was recognized on July's 5 by Creat Britan power ever since It has never been accented by some members of the

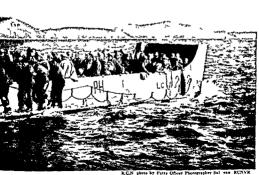
former government in-evile who claim that the country's leaders are trying to eet up a communist government on the Russian model

In lugosava too a government backet by Russa won the day over a povernment in ratle A community guernilis factor Tin, in ratle A community guernilis factor Tin, and the ratle of the ratle

On November 11 1945 elections were held for representatives to a National Assembly of two houses. It to a enemies claimed that he was determined to set up a communistic form of government—a totalitar. nan or as they put it a Titotalitarian government. They feared that the elections would not be fair and therefore they an nounced that they would stay away from the polls. Naturally Titos candidates won and and thereafter his power was supreme On November 19 the two houses of the Assembly approved a proclamation by Tito abolishing the monarchy and setting up a both they would be supported to the property of the they have been also they are they are

The Belgian Government in Exile returned to its native land on September 8 roj4. king Leopold recognized by this government was a prisoner of the Naz 5 and of course would not be available until after the war Therefore the Belgian Parl ament chose Prince Charles Leopold 5 vounger brother as regent to act in Leopold's place Pretimer Hubert Pierlot of the Govern ment in Exile was very unpopular and he was forced to resign on February 7, 1945. He was succeeded by a Socialist Achille van Acker Van Acker ikke many other Belg ans held that King Leopold had betrayed his country when he surrendered the Belgian army to the Germans on May 28, 1940. Van Acker declared that the country would never be willing to have the King return to the thone.

Leopold was freed from the Germans in the early days of Vay 1945. He delayed it is return to Belguum but announced that he still considered in mself to be the country sightful ruler. Public op n on was against him On July 17 1945. He Belgian Chamber of Deputies barred the King from returning to the throne without Parl aments permis.



A leading craft from the Canadian warraty H.M.C.J. Prince Brary active in the desperate civil war in Greece.



EUROPE





French Press and Information Service elderly French woman casting her first vote The sion Prince Charles is continuing to serve

as regent The Greek Government-in Exile returned to power in Greece in November, 1044. when the British occupied the country King George II, however, agreed not to come back

to vote on the question of keeping the monarchy In December, 1944, fighting broke out between the Government and the radical ELAS group. The British arranged for a truce, and a compromise government was set up with Archbishop Damaskinos as regent

Unrest continued throughout 10.15 The country had suffered terribly in the war, and conditions improved but little with the coming of peace. One premier after another gave up the attempt to form a stable government The regent himself was so disheartened that he resigned in November but he was per suaded to remain in office

Little Albania which was swallowed up by fascist Italy in April, 1030, has become a republic The United States, Great Britain and Russia agreed to recognize the Govern ment on condition that elections for a Constituent Assembly should be 'on a free hasis" In the elections, held on December 2 1945, the Democratic Front party of Premier Enver Hoxha won all eighty-two seats in the Assembly Hoxha is a national hero He was a leader of the Albanian under ground when the country was under the rule of Italy

Of all the European nations that fought on the Axis side, none was held to be more



After war work! Here we see werkness rebuilding a was ruised visdoct near the city of Mantes in France

guily than Germany which had started the war in September, 1933 and which had been guilty of unspeakable crimes against hu manity. The Allies were prepared to occupy the country for years if necessary to make sure that nazam would be destroyed and that Germany would never gran he able to threaten the peace of the world. In accordance with the plan suggested at

the Crimea Conference Germany was oc cupied by the United Stites Great Britain Russia and France each taking over a definite zone. The commanders of the Villed Control Council, which had its beadquirters in Derlin. All problems concerning Berlin and the country as a whole were dealt with by the Council a unanimous vote of the four members was refuuerful for every decision.

The zone system did not work versumouthly Fach zone became more or less solated from the others and this made it difficult for the occupation authorities to set up efficient centrol over the country, as a whole There was no generally accepted plan whole There was no generally accepted plan to consolate the set of the consolate that the consolate is a proper made public on November 28 Buron frice a special investigator for President Truman reported that condition had because of the lack of a unified system of administration.

### THE PUNISHMENT OF MAZI

Vet in spite of the difficulties are obsert in the occupation of Germany the Allies rands definite progress in carrying out the provisions of the Crimea and lotslam conferences. Various steps were taken to punish the native art runnals. A few of them took, the progress of them took the their crimes Almong these were Paul Jesuico Goebbels the cheef propagandust of the Nazis Hiennica Humuler the chief of the Gesting, or secret police and Robert Ley Gesting, the Crimea Common of the Commonly believed than the Commonly believed that the Crimea and the Commonly believed that the Crimea Commonly Adolf Hitter, also committed success and the Crimea Crimea and Commonly believed that the Crimea Crimea Crimea Adolf Hitter, also committed success and the Crimea Crimea and Crimea Crimea Crimea Crimea Crimea Crimea Crimea Crimea Adolf Hitter, also committed success and commonly and crimea.

### PLOTTING AGAINST WORLD PEACE IS THE GREATEST OF ALL CRIMES

Other leading war criminals—twenty four in all—were indicted by the International War Crimes Tribunal and twenty of them were brought to trial at Nuremberg on November 20 1945. They included Hermann Goering second only to Hitler in the Nazi partix, Rudolf Hess, deputy Nazi partix

leader until 1941 Joachun von Rubbentrop foreign munister Field Marshal Wilhelm Ketel chief of the German high command Grand Admital Karl Doentic commander of the Navy and Alfred Rosenberg, the socalled thinker of the Nati party. The de fendants were accused of a wide variety of crimes from plotting against the peace of the world to the killing of helpless prisoners

The trial had not been completed by the end of 1943 and it seemed likely that it might last for months In the meantine 1 number of lesser German was criminals had been tried before military courts and had paid the penalty for their crimes They in cluded members of the German armed forces and crulians who had been guilty of crimes against Allied soldiers they also included a number of commandants and guards who had served in the infamous concentration camps

#### THE QUESTION OF GERMAN ASSETS AND WHAT GERMANY SHOULD PAY

Progress was made in the mutter of obtioning in partitions from the German: The bringing partitions from the German The revealed that Russia and Poland were to provide that Russia and Poland were to the Russian troops The United States Great Britain and other countries were to take over German assets in the western zones of Germany Russia would also receive a certral amount of reparations from these zones Representatives of eighteen nations men in a Parasia on conference than an expension of the was in which the German assets in the west ern zones should be divided.

The tearing down of Germany's war in dustry went on at a steady pace Many far torres which had manufactured guns ammuntion tanks and planes were bloom up or were stripped of their equipment. However the question of just how much industry will be left to Germany has not been de cided because the Allies have not been able to agree on this froublesome matter.

### CAN GERMANY LEARN TO UNDERSTAND THE MEANING OF DEMOCRACY?

The Nazi party has disappeared though some people think that it has only been driven underground. The Allies hope by teclucating the German people to prevent the Nazis from ever returning to power. The occupation authorities have removed many magit teachers from positions of trust and in

fluence and have replaced them with teachers of known democratic sympathies. They have also banned the use of the textbooks which glorified the Nazis and their exploits. The re education of the German people will prob ably be a slow affair Observers agree that most Germans have no sense of national guilt they regret only having lost the war

Austria annexed by the Germans in March 1018 has now won her freedom When the Russians occupied Austria in April 1945 they backed a new Austrian republic set up by a combination of Com-munists Social Democrats and Christian Socialists and headed by a Socialist Dr. Karl Renner At first Great Britain and the United States refused to recognize this republic declaring that it was not truly repre sentative

In August 1945 the Allies agreed to set up a four zone occupation system in Austria the occupying powers being the United States, Great Britain Russia and France

the Renner Government two months later It was destined to remain in power for only one more month for it suffered a disastrous defeat in the November 25 elections for a National Assembly The conservative Cath olic People's party won eighty four seats the Social sts seventy six The Communists who had placed an important part in the Renner Government obtained only five seats On December a Leopold Fig. head of the Cathol c People's party took over the post of chancellor (chief minister of state) replacing Renner

The small republic of Finland which fought Russ a twice in World War II and twice had to sue for peace has sought to co operate with its powerful Russian neighbor particularly since the liberal government of Premier Paasikivi came into power in April 1945

Hungary which had joined the Axis in November 1040 underwent several politi cal upheavals in 1945 After the Russians forced the Hungarians to s gn an armistice



Mani leaders on trial Nuremberg Germany This trial cought to combine expressive warfare as a crime T 129 7



Br. sh Informs on Services Food from England on its way to hungry Europeans.

in January 1945 a rad cal government was set up in which Communists were very powerful. But this government was over thrown as a result of the elections of No vember 5 1945 when the conservative Small Holders party won a majority of the seats in Parliament. The United States and Great Britain have recognized the govern of thinking and Hungary because the most of the parliament of the property of

Bulgaria and Rumania had not won rec ponition by either the Americans or the Brit ish as 1945 came to an end In both coun

tnes radical governments had been set up Italy which was the first Isacust state and the chief partner of Germany in the Aus pass failern or veil days. Whe lost her African proper in the war and it. The certains that all of waste in the ocurs of almost two years of Italy and the ocurs of almost two years of the Germans following the Italian surrender Today there is widespread misery and want among the people Visusol m, who brought Italy min the war on the radic to the ocurs of the Italy and the war on the radic to the Visus of the Italy and the Visus of the Visys of the Visus of Vi demn with equal bitterness the royal house of Savoy

Yet currously enough the house of Savy still relies Victor Emmanuel III who came to the throne in 1900 still bears the title of lang of Italy but the has turned over the royal powers to his son Crown Prince Hum bert whose official title is Inettential Center of the Prince III and the still relies of the Gest Estiam for this situation. Some day perhaps the Italians will be allowed to de ode for themselves what kind of government they want.

And what of the neutral countries? As we have seen Switzerland and Sweden were democratic countries which were forced to position. The neutral ty of fascat Spain was chiefly due perhaps to the fact that the civil war of 1936 1939 had felf the rehausted Certamly the Spanish dictator Gen sympathy with the Axis powers in the early days of the war.

ROW FRANCO TRIED TO WIT THE APPROVAL

### OF THE UNITED NATIONS

As the Allies gamed the upper hand however Franco tried to win Javor with the United Nations. He freed hundreds of American and British flyes who had been forced to land on Spanish soil and who had been interned. He forbade the export of war materials to Germany. He recalled a number of Spanish volunteers who had fought on the side of the Germans.

Franco also sought to appease the All'et by making bis government more liberal Or October 22 he took what he seemed to that was a decisive step in this d rection. He issued a decree giving the Spanish people a bill of rights It was indeed a curious document it permitted Spaniards to do almost anything they wanted provided the dictator

approved of what they did!
The Allies were not much impressed by
Franco's efforts to win their good will The
Franco's efforts to win their good will The
Franco's efforts to win their good will The
House of their their their their their their their
House of their their their their their their
France And yet Tranco continued to rule
The Chief States Great Britain Russ a and
The Chief States and Great Britain agreed
with Russia and France that the Franco
Government was band But they leared that
an open break with Franco might strengthen
an open break with Franco might strengthen
who would revent foreign intelerrence.

I ortugal like Span is a fassist country. Vet for hundreds of years it has been bound by tres of friendship with Great Britain It certainly helped the British and the other Allied countries greatly in the never ending fight against the German submarines by granting the British a naval base in the Aores It is probable that Portugal took this step as a result of Allied pressure. At throughout the war It carried its neutrally so far as to decree public mourning for the death of Adolf Hilder.

Eire has occupied a rather curious pois tun for a number of years It is bound by certain ties to the British Commonwealth of Nations Yet it is no dominion like Canada or Australia but a sovereign independent state. It conducted itself like a sovereign independent state during the war remain ing strictly neutral

#### THE PUZZLING ANNOUNCEMENT MADE BY RAMON DE VALERA

On July 11 1945 Prime Minister Eamon de Valera caused a str in the Eire Parlia ment when he declared that Eire wais a re public Several days later he replained that his country had become a republic on December 29 1937 when its new constitution went into effect Did this mean that from now on Eire meant to throw off all ties with Great Britain? Not at all! Eire de Valera went on to say is still associated as a mat ter of external policy with the British Commonwealth of Nations

The political developments that we have been discussing are of great importance for upon them will depend the future of the European continent. Yet there are other problems which are even more vital to mil lons of people A particularly pressing one is that of providing relief—food clothing and housing—for the needy of many lands in 1945 the chief burden of supplying relief fell upon the United Nations Rel et and Re labilitation Administration (UNRRA). A number of members of the United Nations

are taking part in the UNRRA program Another problem is that of providing for displaced persons that is refugees driven from their homes and unable to return One estimate that of Britains Royal Institute of Foreign Affairs sets the number of displaced persons in Europe at Wenty million of the property of the property

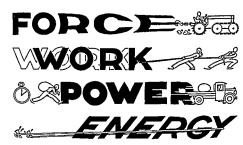
clude Jewish victims of the Nazis and great numbers of Russians Poles Belgians French Czechoslovals and Yugoslavs who were brought into Germany to toil like slaves in the fields or in war industries. The task of cating for these people and restoring them to a useful life will be one to tax the resources of the UNIRRA and other agencies.

The story of Europe in 1945 is not a pleasant one. The continent has been freed from the nazi yoke but the most terrible war in the history of makind has left behind it unspeakable misery. Moreover quarrels among the victors have aroused test that the Alhes may lose the peace after having won the war at freshful cost.

"The chief hope of the future lies in the United Nations Organization (UNO) the new league of nations to which many of the countries of Europe belong (See the United Nations) In 1945 the UNO existed only on paper the first meeting of its Assembly was not the contribution of the countries of Europe and the countries of Europe and the Countries of the Countries and prosperity of Europe and indeed of the whole world, said deeped upon the ability of men of good will to make the UNO really work.



Back who a they same from! German leaving Holland,



Simon Weissman

H AVE you ever heard your friend strike a wrong note on the piano when play ing a very familiar piece? Either you laughed or became annoyed Good musicians do not make such mistakes.

Have you ever heard people use words that do not belong? Surely you noticed that too! Once more either you laughed or he came annoyed 3 out Pragible teacher insists more much more, executing in their use of words For instance, the words force work, power and energy are often musised by ords any people because their meaning is not really understood In science each of these and can not be literalized with the others.

and can bot be intercapaged with the others. The world "force appears very often in the others. The world "force appears very often in of force." The gravitational pull between the earth and your body when you are standing on a scale is a force. We drop a ball and it falls by the force of gravity. A mountain stream rusbes to the sea by the same force of gravity. Our own muscular pulls and pushes are forces: The force created by an explosion of powder in a cartifact existes a lead builtet to move at high speed, when the additional to the standard of the standard of the scale is produced when the cartifact is produced when the standard is the standard of the standard stan

a body or changes of motion in that body When a brick is attached to a spring scale you will notice that the spring scale stretches a certain amount When two bricks are at tached the spring will stretch twice the amount and three bricks will stretch the spring three times as much. Thus we can see that the gravitational attraction of the earth for the brick which is a force can be mean ured by measuring the amount of stretching which the force produces in a coiled spring Suppose that each of the bricks weighs two pounds Attach a string to one of them What would be the tension or the pull, in the string? The answer is obviously two pounds To prove this insert a spring scale any place between the brick and the string the spring scale will read two pounds. Thus we see that the gravitational pull on the brick is a force that can be measured by means of a spring

From this little experiment, we also learn that tension is a force, to We have men tioned before that muscular pushes are also forces. If you take a coiled spring between your hands and compress it you will not a force just as in the case before a force of the control brick will compress the spring when placed on top of it just as much as it will clongate (length on) the spring when supended from it in

where the control we have a return where the state of the control and a sta

### OS SCIERCE IN LINEIS EXPLI REVRINCE ME SHORID TEVEN 10 DES LINES LEURS

moves and so it does work air is converted into kinetic energy when it energy of the pile driver when it is in the the ground Thus we see that the potential descend it can do work by driving a post int the pue driver is released and allowed to mean by energy-ability to do work when of doing work This is precisely what we we know that this pile driver is now capable assored in it from our discussion betore third work is done on it Potential energy diven into the earth Il ben the pile diver an of at 1801 (180d a) and a noqu list of some teet above the ground and then allowed -s buge weight that is lifted by machinery this clearer you know what a pile driver is talling we ght Another example may make being converted into kinetic energy of the tential energy of the litted weight is slowly the clock. Here we see an example of how pothe time they descend slowly and operate Since the force of gravity acts on them au are litted potential energy is stored in them ated by falling neights "hen these ne ghts on may know that some clocks are oper

### IL IS V CVBVCILA LOW EDIDES MORE BOLEMINT EMERGE IS STOKED EMERGE!

spow that kinetic energy can do noth nuckes away are only a rew examples to wood the rapidly moving rivers which carry scending nammer which forces a pail into an aut dius e saustrouap us un opadiot Greek word for motion ) The swiftly moving kinetic energy (Linetic comes from the Every body which is in motion possesses poster are also examples of potential energy of water at high level and the steam in a spring is called potential energy the body energy that has been stored in the clock (the wound up mainspiring of a clock) The capable of doing work at some future time (a torpedo heading for a ship) or it may be mediately due to the fact that it is in motion A body may be capable of doing work in

clude that energy to the copacity for doing

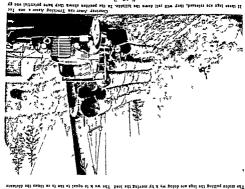
subjes we have just mentioned we can con work was done in that case from the ex DUCKS to the top moor of the nutiquing Surely as we have mentioned before, in titing the may be used to drive a steam engine such ground work has been done A steam boiler grand the nour and when the hour has been turn is convected to the proper grinders to wheel of a flour mill. This water wheel in ierel is showed to fall it can turn the water of the clock When the body of water at high main pring of a clock does work on the gears morors The mechanical energy stored in the to do work it we connect them to the proper steam confined in a steam boiler are all able nd schang a mody of water at a n gn tevel and the capacity for doing work. Thus a couled that under certain conditions bodies possess From our everyday experiences we know

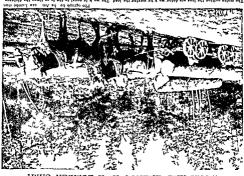
### MORE IS MEYL ME ENOM VS ENERGE

эшц ка рэргир NOTE IN ONE LEATED OF the time Power is work the man because it does the same amount of the steam engine is ten times as powerful as rique tue work by the time in our example an engine such a comparison is made by di paring the work of a man and the work of power Time is an important element in com it is pecause the steam engine has more to hit the bricks to the top of the building ezerted it it takes the steam shorel less time certain amount of work the more power is work is done. The less time it takes to do a count the time element of the fale at which GODE LOWER IS & LETTE WAICH TAKES INTO AC into the calculation of the amount of work amount of work is done Time does not enter WOLF IN ONE ROUT IN CACH CASE the Same that a steam shovel can accomplish the same to the root of a building in ten bours and suppose a man can carry a ton of oricks

## OL LIME IMIO CONSIDERVLION INE LERM BOMES LVEES INE EFEMENI

time against Hortonas Hesslence (1 He of a billough hip western steel building do no nosk allough hip western great expension of a d d work hidrer would have to be motion and d d work hidrer would have to be motion and of the work of the motion of the decountry get tired but you will do no work you may get tired but you will do no work you may get tired but you will do no work you may get tired but you will do no work you would be not a seek of the phase of the work of the work of the high great work of the work of the work of the high great work of the work of the work of the high great work of the work of the work of the high great work of the work of the work of the high great work of the work of the work of the high great work of the work of the work of the high great work of the work of the work of the high great work of the work of the work of the high great work of the work of the work of the high great work of the work of the work of the high great work of the work of the work of the high great work of the work of the work of the high great work of the work of the work of the work of the high great work of the work of the work of the high great work of the work of the work of the high great work of the work of the work of the high great work of the work of the work of the high great work of the work of the work of the high great work of the work of the work of the high great work of the work of the work of the work of the high great work of the work of





MOKK AND ENERGY IN A LUMBER CAMP



**CERMANY** B) George M Shuster

war, you would probably have gone A AD you visited Germany before the

Turning southward, you would soon have nouses in Eining speare There are still some old seven gabled isn merchants settled in the days of Shake toric town is Elbing where a colony of Eng. teresting of the old cities Still another his

born, Rostock and Danzig are the most in President Hunter College

Seiner with its tributaries, is also the nerve scenery along its banks The lordly met, to tota uave enjoyed pecause of the romantic thest west is the Rhine, which countless vist were centered in the great river valleys, raimany as well as its modern industrial life discovered that the historic beauty of der-

destroyed so much of it, Cologne had many fierce fighters ) Until the war against thurs torests (The Romans failed to conquer these times, led by Arminius, in the surrounding legions to conquer the warline German annen the Emperor Augustus dispatched ma was once an ancient Roman town, trom Cologne, the largest city in this valley, Center of Cerman mousely

nows through rich coal fields and empares A slugged little stream called the runn beautiful buildings, among them chureness

> city a lamous museums and theaters tormer irussian kings, and for trips to the the Brandenburg Gate to the palace of the and government buildings, which leads from Lunden, Berlin s wide thoroughtare of shaps had it, not beer for walks down Unter den Builes for harder have seemed unineering capital, across very tiat country, the stay ilave taken a tast train to Berlin, the nation's the Aorth Sea Then you would probably tivers, which empty thto the same section of I pese are old crites on the Elbe and Weser by boat to either Hamburg or Bremen

> Deck, where the novelist a normal stann was realth and culture in those olden times Lutitin conscios of these towns testiny to their halls, lashioned of dull red brick, and beauirade 'the timbered houses, quant town dere are built up a prosperous toreign chants, which as early as seven hundred called because of the Hansa, or guild of meros 'samo aam to anglear on pasturet aut on Bremen and Mamburg, these once belonged becausedore towns stong the seacoast Tipe Atter Berun, you might have visited some

where a wome above regions and and the armony has been most all decised by the geography of the count most allocated by the geography of the through court between the country of when the country of which is a contract the country of the country o

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### 10 AIETD COOD HYBAE212 INE SVUDA EVZIENA DIZINICIS VKE MYDE

morning till night gathering the clusters bicking time keeps whole lamilies busy from and the plants are tended by hano Grapespring During many months the soil is tilled winter pave to be carefully repaired each to sagain in bashets and the rayages of earth nashed down by the rains must be car and beaus shop the sloping ground but cions pecause the grapes ripen best in the and stroop that it stalles a stroop most gar religiced pious that cover steep musides its illustrations flere the vines grow on little glong the Rhine and the Moselle are good in spite of many difficulties. The vineyards lertile, but in general he must make a living tom in some regions the ground he tills is closely attached to the soil and to local cus peasant Like the French peasant he is methodical and scientific than the French The German farmer for his part is more

# IS ESYCLICED CONSESAVATION OF SOIL

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# NYMDICKYLLE EXIEL SIDE BY SIDE

year by German tarmers and artuans tile, was periormed teverently every tenth tassion thay, relating the story of Christ's these towns was Oberammergau, where the stand still-that 15, before 1939 One of charming old towns where time seemed to Baratian Alps Aestled in their valleys are snown of these ranges in Germany are the and the Carpathans, Perhaps the best by mountain ranges, offshoots of the Alps Danube is flanked over most of its course tope it empties into the Black Sea The stream, the galenay to southeastern Eu many, but later on it becomes a mighty region of Wurttemberg, in southern Ger met at its source in the hilly, picturesque southeasterly course. The Danube is a small across half the width of Europe taking a Danube with its tributaries which flows There is at least one great exception, the

# OFFICE DYNOSE PECIAS II STORY OF THE STORY OF THE PROPERTY OF THE PROPERTY OF THE PECIAS II STORY OF THE PECIAS II STORY OF THE PECIAS OF THE

Tables each the Dilbe and the Oder never officers and the Certains and the Certain Theory of the Theory of the Certains and the Certain Constitution of Certain produce and manufactured the Oder on miscule the other invest of the Certain produce and manufactured Certain produce and manufactured the Oder and more of the Chief. There are the Oder and more of the Chief. There are the Control of the Chief. The Chief of the Certain Chief. The Chief of the Chief. T

and the Rhine north of Cologne, Near He properly and the Cologne and the Cologne as Essen, showed the Certains steel industry to that industry their on our manel of Germany, so that industry their on our imported from Relatively thitle room as mused of Germany, so that industry their on our imported from the Cologne of the Rhine of the magnifications of the Rhine of the magnifications of the

rugaity and religious feeling In their time of Saxon monarchs, notable for their energy stowed only by the Pope First came a 1 ne the imperial Crown which could be beand to preserve for their families the title to nutnjà nopjemen who were their subjects man rulers strove to retain control over the During several centuries thereafter, Ger

a result of the Pact of Munich (1938) many which came into being temporarily as was about the same in extent as the Uer rated The German kingdom thus created Cerman portions of the Empire were sepa another Finally in 843 the Frankish and tons tapes tonkht and schemed against one Kival factions began to quarrel and the var could not maintain the unity of the realm Uniortunately, Charlemagne s successors partiaser could be presented

it made possible a Christian dominion in on which it was based were convinced that beobies and those who cherished the idea nation but a sort of tederation of European allegiance to him het this empire was not a countries nere allies or owed some sort of of central Europe enghboring tribes and land western Germany and other sections taxing dail to from medd to first one minion over a vast area -- what is now Prance Holy Roman Empire He was thus given do at Rome with the new title Emperor of the in the year 800 Charlemagne was crowned christian schools in northern Europe

pel eved in education and founded the first ity its also tostered the arts of peace tie ons and compelled them to accept Christian it often merciless king subjugated the Sax seat of his rule in Aachen this truly great magne (768 814) Having established the This took on definite form under Charlethe tranks set about fashioning a Lingdom ings Clovis and Charles Martel leaders of with what they understood to be its teachthe source of unity and order in accordance tains to Christianity Religion now became the convers on of powerful Germanic ch el new social order. I his came about through Second France provided the basis for a

#### TRIBES IN THE MINTH CENTURY CHRISTIANITY COMES TO THE GERMAN

these tribes---the Franks indeed france gets its name from one of man tribes in the west pushed into Prance occume predominantly Slavic while the Ger ceased to exist The territory east of the Eibe once have been called a German race tribes became so interwoven that what m ght central Europe Slavic Germanic and Celt c very notable effect upon the development of Vandals to rule Europe These drives had a Coths and later attempts of other tribes the Then came attempts of tribes known as the Chaos followed the collapse of Rome

Roman Empire

across Germany, and eventually invaded the Slavic finally gamed the upper band swept Europe some of them Germanic others OF THE MIBELUAGE The tribes of eastern man chics, notably the Enpa and the Souc rath piaroth can be gleaned from the Ger spont their rel gious beliefs and their mili a nell ordered society. Meager information Koman Civilization, were unable to establish in sea sponkip speak pag some contact with part the unconquered tribes north of the

areas of waste land under cultivation metance in Spain where they brought east Romans in various parts of the Empire for Colonies of these farmers were settled by the able service by practicing the art of larming lines rendered Europe an enormously valu who lived under Roman rule south of the but much emphasis on family life Those pare you a traing from the soit and to have exqeq ruto many tribes. The people seem to ancient Germans except that they were di the do not know a great deal about the and Vienna

Cologne eastward to Regensburg (Ratusbon)



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troin religious purpose erich had created a state that was divorced hostile to the Holy Koman Empire for Fred ow the Papacy and its Italian allies were th opice could not be maintained after mis

Linpire could not be maintained after his and influence As a result, the unity of the served their chance to increase their power seigom erated and so the German princes terest in the allairs of Germany, which he not a religious man trederick took little in an author and a lover of the arts. He was guages and understood science ite became and Arabian teachers He knew several lan of the Empire he was educated by Greek Sicily, which had become a flourishing part cieatty in the life of Frederick II Reared in in the German outlook are reflected very rossa, one of the lamous Crucaders Changes (1194 1150), grandson of Frederick Barba tropenstauffen emperors was Frederick II sau to manning room on 1 visento nombas more Saxon emperor, and then the Hohen Atter the Salian emperors there was one

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and froven was fostered The raining classes of feeters any gradually became deeply religious and interested in the scalester of Linestendomarkey, in these founds times the masses of the people arete very badly off They, less enhightened than the polity, often practiced the old pagan religious and the people are the present of the people are the properties of the people are people are properties of the people are pe

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quarreled with the Lohsh sovereigns and the northeast of Europe But in time they pressive example And they Christianized eupriff last south of Danzig is the most im tes Tuey efected castles of which the Mari which were aminated with the Hanseauc cit nize a vast area. They built towns some of combrayed and the kn ghis went on to cotone sea This mission was successinily ac the marries and woodlands south of the Bal-Linssians then a heathen tribe dwelling in the bing of 1 oland to assist in subduing the teligious rule Early in the thirteenth cen ished lives of service in accordance with a ru gate pledged themselves to live unbiem period of the Univades Those who became several military orders founded during the An Spis were organized this was one of During this medieval period the Teutonic

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The walthier princes maintained splendid adorned with masterpieces of sculpture dur

and were combined as a body war 1 kmg.

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Lasts older rel geous los allies were Deng undermoned I 1131 cane a reform movement led by John Huss. a Crede the logian who was also a popular preacher last use est ofference of to effect the last were conference of the class and the conference of the class of the conference of the conference and were entranced to effect and were entranced to the last ofference of the conference of and were entrance and were entrance to the conference and were entrance to the conference and were entrance to the conference and were transfer to the conference and were transfer to the conference to the confere

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s (eu ijjoq badool ads sunT sqorud arabeas ne noriessi der Austria came to be concerned with civi tor so long left as a unreat to ner eastern ton tet because the power of the sultans was we think of as fusitian to this very day tustrians one the customs and manners that dukedom in France and to Burgundy the in the east Austra controlled Burgundy a west while warding off attacks by the Turks to detend the boundaries of the realm in the seat in Vienna Austria and their task was nam neu sanuta spant situngsderr aus or one dynasty to another to come back at last bests that followed the crown passed from riapsburg prince was elected emperor in the The Interregaum ended in 1273 when a

# THE HAPSBURGS BECOME THE MOST

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recruited by torce and supped abroad the American Revolution These troops were Sump some detting and in barries armies during as soldiers You already know of the riestually sold by their princes to other nations were almost extinct. Many Germans were acdependent city men) of previous centuries over their subjects The proud burghers (inarchs, who exercised unlimited sovereignty of the states were governed by absolute monlottly of the citizens or by the ruler alany pold the religion professed by either the mathese small states, a court was pledged to up ductues and free cities In the majority of great number of independent principalities, Cermany was now (to48) made up of a tle disputes

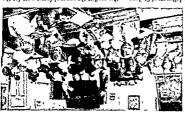
a league of European nations pledged to setrunnung yant (124-1804) He advocated nuficant of these was outlined during the erethqua tobics of discussion. The most sixand plans for the preservation of peace were rence by the German people for a long time of modern Cermany War was held in abhor a considerable extent, determined the outline boundance of the German states It also, to busha, signed in 1648, fixed the religious longing for peace set in The Treaty of West much treasure was consumed that a universal os pue isol sant ines nere lost and so war once again, and wrought terrible havoe Later a Franco-Swedish alliance waged after the Swedish Ling had fallen in battle army won notable victories but was deleated an support of the Protestant forces. This Ang Gustavus Adolphus invaded Germany powerful swedish army, commanded by able general of doubtful character 5000 a most part commanded by Wallenstein, an this conflict the imperial forces nere for the

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Even so, the test anticased a great increase of inference of inference in crease alterna as well as the growth of the modele class I have set to even alternative and part by the talsian kneary was milwenced in part by the falsian hebe Vehichalands This was an era of great the Calculation of the part by the companies of great the companies of th

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and the promise of the future.
Thus, despute 11s lack of political organi
zation and the blesh poverty of many of its
people, Germany had become, at the close

when we have a compared and all to have self in the consequent and all to have a present and a consequent a consequent and a consequent a consequent and a consequent a consequent and a consequent and a consequent a conseque

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effect of power of exhibition (1550, page 500, page 500,

Literature, too, slowly revived During the engineenth century. there are a rebuilt to the Corman poetty milwored greatly by Eng Bin models Highest attanced unstick refore scaled in the work of three nor later were Scaled in the work of the most later were Scaled in the work of the most later were Scaled in the work of the most later were scaled one and an acceptance of Germany & greatest demanders, and a now

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many, he knock as with the current and control of country. The current and country has been a control of country the current and country has been a country to control of country. The current country has been and papers and the current country as and country the current country and country the current country that countr

Lowerd the close of the seventeenth cen

died in 1786, Prussia had become a strong up) of Poland When Frederick the Great Kussia and Austria in the Partition (cutting Thereas of Austria, and had shared with bitest from his nval, the Empress Maria cars, Fredetick had nrested the realm of a dabbler in the arts, and a friend of the French philosopher Voltaire, Within a few upon occasion, wathise monarch Frederick state possessed a very gifted, cynical and, It suddenly became evident that the little was deemed to add juster to the ruling house organized in Prussia because such a force and efficiently ruled A standing army was this point it was autocratically but frugally ruled by the Hohenzollern family and at territory from the Teutonic Anights It was enlarged primarily through the purchase of denburg in northeast Germany and had been consisted originally of the territory of Bran powerful This hitherto unimportant state gradually the Amgdom of Prussia became were nominal rulers of the Empire but very ert) stricken Germany. The Hapsburgs still sushed the culture of a backward and pov during which French taste and French ideas ALV (1638 1715) in particular was a period on the Continent The age of Ling Louis trance had become the dominant power



The peace conference, known as the Congress of Vienna, doomed these hopes to ex-

up the states came ont strongly to, backs the states came on strongly to, packs the states came on strongly to, packs the states came on strongly to, packs the states came on the states of packs the states of the states of packs the packs the states of packs the states of packs the states of

### ZLIES VIT CERRVAL DEZIEK LOK DRILL GADEK OVE HOTEK

hilled cound field Prolesse gather, identicate a number of section of the country of the country

erist some of the Austrian mountaineers eration was enkindled and Prussia, however a fierce desire for libstates became allies of Napoleon In Austria began Bayarra and other South German deleat and virtual conquest of all Germany parte assumed command of this army, the of national sentiment. After Napoleon Bona a great and entinusiastic army on the anyth onced conscribition, declared war and forged newborn French Republic France intro Prussia in 1992 constituted a threat to the An alliance entered into by Austria and his Austrian born queen, Marie Antoinette strove to detend the cause of Louis VVI and tellectuals, but opposed by the rulers who ning It was nelcomed by many Cerman in olution is applied, had its turbulent begin in France, to which the name of French Rev Then the long process of political change

### INIO IMO CYMD? NYBOTEON DIAIDER THE CEBRYR RIVIER

of the eighteenth estimay, the brone of gird, poorls, articles and thinkers for the most part, such men were dependent upon the focult rath the prestage of their names has oout vait the prestage of their names of not the other hand, many of the monarchs were miling to excend theirty of expression to more of grains and raining.

of Lincoln
Pruzeia next stood forth for German unity At first her motive was a real desire for
liberal government Then (1862) Prince

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# CYARE AMMERITONS AND EACTORIES

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a new and heteral Germany.

This was a stateful hour in modern Germany.

The demand for unity and referred in one case, but hopes grew drin except in in the more liberal instead of particularly and the more liberal moded South German olds some good resulted from the rule of Sapologo, and the particularly and the particularly applied to the particularly and the particularly applied to the particular for the particular for the particular particular

mention A Menta and Pressaci and on merge each was been on establishing the sound of the each was been on establishing the sound of the and both and the sound of the house of the sound of the sound of the house of the sound of the sound of the house of the sound of the sound of the house of the sound of the the sound of the the sound of the sound of the sound of the the sound of the sound of the sound of the the sound of the sound have a man and a man and a man and a man a

### MITH A POWERFUL MAY CERMAN COMPROSES THE WORLD

tente Cordiale, in 1904 triendly sort of agreement, called the Enwith the German Empire, turned instead to France England and France formed a bor ernment, which had sought an amance a result of this arrogant attitude, the british of its might and its willingness to night As to get such offers, Germany relied on stress others, the most suitable friends In order tries but should select, from offers made by should not court the good will of other counnemet that so powerful a state as Germany 1929) He seems to have been guided by the doubliess Bernhard von Buelow (1049" The ablest chancellor of this period was retested in the doctrine of Aryan supremacy and dangerous ideas. Thus he became inmally sensitive and influenced by romanic shrew dness, but he was unbalanced abnor thilbelm was not without intelligence and enect of the foolish and warlike speeches scies, and, on the other hand, to solten the ont the Emperor's blindly unreasonable pola ho attempted, on the one hand, to carry ass tollowed by a series of weak statesmen tron Chancellor was compelled to resign rie nmeell at odds with Bismarck The great the throne, and almost immediately declared

### MITHERN IL PROYES TO BE A STUBBORN, WARLIKE RULER

This episode is known as the Kulturkomp! sttack he waged on the Catholic Church. argely due to the savage, but unprofitable, not enceed in the second endeavor was the dominant mende Germany That he did time he strove to make the Prussian way of britain and even France, while at the same He courted the good will of Kussia, Creat to maintain the balance of power in Lumpe sciently powerful, and he strove carnestly hered that the new German Empire nas subthe victories gained Bismarck, it is true, becibine which they deemed responsible for ing of strength, and applauded the fron dis daeuces ylany Germans reveled in the feel destined to have the most somber conse

Then (1888) Laiser Wilhelm II came to

So now, after the Versailles Treaty of 1871, the Germans were united It appeared tutional monarchy by reason of a successful nar This gave rise to a militaristic spirit

neguone custions of opera ner, later on to become one of the most ilthe Revolution of 1848 was kichard than passionately interested in the outcome of many Among the younger men who were great Cathonic poet of southeastern Gerdorn, who lived at the same time, was the guage, was Jewish, while Joseph von Eichen the best known lyrics in the German lan groups Henrich Heine, author of some of dom at home These belonged to many were tollowed by others who gave their of the time of the wars against repoleon was rich and varied. The poets and thinkers ness of the age of Coethe Nevertheless, it and 1871 lacked much of the simple great ATUSTIC AND INTELLECTUAL INC DELWEER 1800

#### IDEV OS LESEDON CERNVA BOEIS KEES VIIAE LHE

The iterally was signed at Versalles need to proceed a Versalles and to the Common of the Versalles and to the Versalles and to the Versalles and Versalles

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# FOR BISHARCK AND PRUSSIAN IDEAS

Vito von bismarck was appointed President of the Council of Ministers by the Prussian Ling This able, resolute and other macru pulous man turned Prussa from the liberal way and tonard a harsh, arrogant spirit

The results of German diplomatic blun the demands of Austria, ednetty unsuccessint in an attempt to sorten was unsuccessful and his chancellor was mand their order of mobilization in this he dear ored to miduce the Russians to counter of the semousness of the situation. He en sible wat) Laiset Wilbelm was now awate moops to be mobilized (made ready for pos France how the Russians ordered then Before issuing this warning the Russians had conferred with the government of threat to Serbia (like Russia a Slav state) declaring that it would not countenance any action, the Kussian Covernment intervened agreed that stiff deniands should be sent to the Serbian Government Learning of this Wilhelm II and the German Chancellor who Berchiold discussed the matter with Laiser viewed with alarm by the Hapsburg Empire curbing Serbia the ambitions of which were garded the assassmation as a reason for tustrian foreign nunister Sarajevo a Serbian town Count Leopold to the Austrean throne was murdered at Archduke Franz Ferdinand heir apparent

During the summer of 1914 a footier and the Emmer and the Emmer of the

began io form over Europe On June 28

able common and duels were rebarded as honor Que Daziana 1920 of 21 'Silia Esney off'. This Esney off' and but off a silia off a silia

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the tingh Command supposed morale of the troops was actually better than ger of starvation On the other hand the neet The people at home were in grave dan was without either tanks or an adequate air bioniems conjq no jouget pe solved and it nad no reserves of man power us suppor m mark machine had been badly beaten it this case 1 ghting was never resumed There could be no doubt that the Laiser's po verini ambet ce is a temporary stop in ngnunk which its High Command had requested An Deiman Army was granted the armisme to Holland and on covember 11 1915 the man Cab net sued for peace The La set ned ted that the war had been lost a new tier, it the request of Ludendorff who admit

"Meanbull bowerer the government of the Leuted States had become unvolved as a the Leuted States had become unvolved as a submitted and the Leuted Library and a submitted to declare was on Germany and Leuter to declare the Leuter Le

### THE UNITED STATES ENTERS THE FIRST WORLD WAR ACAIMST GERMANT

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D[40 # the catastriphe which soon enguited the pore a heavy measure of responsibility for the righteousness of its cause and yet each iett tot tue tient Lach nation telleved in connenes sold ers sang and lat ghed as they plood treasure and social stability in many the thus started would ultimately cost in breat tertain to one loresaw what the con war against Serbia Russia France and Germany and Justria were committed to claimed a state of war and by tugget 4 gance that she seemed to be acting in the so imbressed by Cerman bluster and arroturch On the other hand Austria had been ing and so fusing could not be left in the apparent it conly dependable ally was tus defing after the days of Bismarch were now gent secusi uniquest, organizations contented at the state of the security of the sum of the security of the sum of the security of the securi

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Cerman porcelain in Uerman porcelain in Uesty Henous, and bero to fractic agures are being painted in delicate colors.

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gantzation of his party, National Sociatist He was persistent nevertheless and the or little noticed He was in prison for a while and for some years theresiter Hiller was man thirts Putich was easily put down attempt is called a Putson (push) in Cer strempted to seize power in 1923 Such an friends notably General Ludendorff, and he gandist and spy Hiller made influential of the Reichswehr of Munich as a propagation the Cerman Army, and was now in the pay titish who had served as a lance corporal in cant. His name was Adolf Huller an Aus them was one who at tirst seemed insigning tor the dissatished and distinhertied Among Viany now sought to become spokesmen राविष्ठाभ्यं प्रधान्न

very tew pronteers Resentment reached to many changed without benefit except to a erty and the whole social structure of Ger titingle crasses were reduced to ausoille poy the war opecutation was unrestrained The honth part of what it had been worth belore December 1923 it was worth only one bit mark ceased to have any real value when in bietely undermining their currency with passive resistance which ended by com arations The Gern and countered this move ruce mete as piedges for the payment of rep valley and seize German mines and mdus the decision of France to occupy the Kuhr the third major problem was created by

One enters this 13 & century Lubech gate below



rurner support came from quite different tormed the movement into a strong party unto civinan hie, it was south that transveterans who could not find their way back 1 18 // blio // bainstmosetb to notissiz sar people, Liven though the nazi movement was not be taid upon the destiny of these young order and bitterness Too much stress can and grown up amidst violence inflation, uismaight into the mind of a generation that the Reichetag This prophecy was based on lournalist had predicted that by 1930 tuese during the nat was coming of age An asilite the party members The generation both the natte (small salaties) and ceremony of urst time were attracted by the unitoring tust Jonus roters Some to the polis for the the Hillerites profited especially by the fact well as the Communist party, began to give During this erists the Hitler movement as

#### TREMESTOR IZAR EAT UTER KOOMO CEEMVES VEE DEVAS

OUG WITH BUILDS SEED OF THE TOLLINGS A HEAT tield farthal son thindehburg grown seri dent of Germany at this time was the joiner Bor ture motion only very slowly the presi chinery of international discussion could be reparations question Unfortunately the ma comment to resort to drastic measures partly rible magnitude compelled the German Got to increase rapidly Soon a depression of ter its were affected and unemployment began America in 1929 German business and cred When the great depression started in toreign credit should cease there would be

strong merease tery much or if the flow of ings it was creat that it unemployment Nes Aue ped Alaies an Ind to thed on son penelits he enjoyed the German citizen was security were deducted. In view of the social month From these estrangs taxes and social coo earned less than 200 marks or 550 a were gannfully employed Of these, 29 500 bobnistion-32 200 000 men and womensucossie pà 1928 approximately nall the entingly wiped out the class that hved on anged housing projects The inflation and proved The government encouraged and were modernized and public utilities in tive transmility and prosperity Industries tord the country enjoyed a period of reta the United States and between 1924 and Cerman finances were aided by toans from of the equally extreme Communist party

nent on side by side with the organization

Axis was formed an alhance between traty Versailles Treaty Second the Kome-Berlin armed force was forbidden according to the and he marched troops noto the Khineland a zone around the Khine Kiver where an donn the nestern boundaries of Cermany nounced the Pact of Locarno which had laid First he deupon international order 133113 ISBARIS 301 Zui ven Suoistaad ineliodun During the same year Hitler also made two or secret political police in the driver's seat Huminler This act on placed the Gestapo prought under the command of Henrich On June 6 1936 the German police were proke down almost completely

susine Germany sistance to Hitler mass murder Ke Die 10r this act of razis responsi tempt to hold the 10 no 10 10u pp Reichswehr 503 Hindenburg and President WG t terra илгропр bergous 000 I uegt stout petus them, it tler exe am ed mostly at t261 m agind poold a grand ISER TO BING MEN LIVES NETE the ยาเอรบดว au I no assodqo 150 destroy all politi or rabio in besu the Nazis at once beats Ihrs act a persod of four lute authority for gave Hitler abso bezz śń sci wdich or papeasond ger tence the ketchs on to steam peneing 14 ÁQ

the chel towns state governments and ousted the officials of of the daily routine The Nazis took over were tortured and beaten murder was part (Communists) Jews Catholics and pacifists than a reign of terror commenced Alarxists to sooner had the results been announced

found to have a meager majority of 52 per the hazis and their conservative allies were who were still allowed to tote were counted

trolling the streets When the ballots of those of high tension with nazi storm troopers pa and bloodshed were held in an atmosphere ph decree The elections marked by tumnit exense for suppressing the Communist party biteal agitation. This annety served as the od pur lutyly spart surfaut ou dosest Aq kinning of the Republic, was now stronger which had been present from the very beon the Communists. The fear of communism bropapja by Aaris Hutler threw the blame March 1933 the Resentating was set on fire Just before new elections were held in support for a moderate position



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the trade unions or nazisen only er---communism

treme or the oth choose one ex that they must Detteved VOTETS Cerman /Igul STORAL SCIDACKS good to spids up ter in Germany ism grew mght נומה מן נפתוכפן भ्या сраисерог Hitler was named веу 1933 в беп i tief jijun uəti пота дыгамам edected to the delegates 213*1*1 izeu Loi 630 to list out at อรถาชา

tzeu əqı pəpre baarge Huler 3543 Bunngemi peld this idea mess men who and enouthing cost of nellare over to pay the enough left there nould be so conducted that

earn the social benefits desired unless it were used was that a nation s industry could not mocracy out the window A fatorite argu employers Thus they favored throwing deto be established by the analocrats and the which, they itankly admitted would have men believed in a corporative social order hers (on ners of big country estates) These and bine stelleitsubm ment bine , Vitebbin quarters-from certain sections of the steel On August 2, 1999, a non aggregregon page Aza signed by Germany and the Sowier Unman gramy nated bloaded attorn of a decisration of page 17 pg samed forces of Great Britain and France were mobblisted for action on the same day Thus began the great

"Acciteties," shough that a star might is to be another, Great Intram Intel in some manner of the star of the star

#### MOSED MYS BECIES BOLVED REXI-AND THE SECORD

The Century and century have flower 10mg out.

Studies to Illifer varieties are seen to see the strategy of the second to the se

(mir and tierts of tanks amassed by the Czech plant together with stores of raw material most supportant armament works, the Stoda and thus Lained control of one of Lurope's county This he did during March, 1939, Trague, the capital, and take over the whole iew doubled that he would soon enter butely Czech regions of the little republic, had promised to respect the borders of the many secured a goodly slice, Although be tor Czechoslorakia was carred up and Ger Cerminal and tealy tituer emerged the tienich, September 39-Creat Britain, France, tour major poners in western Europe at Muconference was followed by a meeting of the berlam, British prime minuster, decided to It the height of the crisis, Neville Cham-

## THE MUNICH PACE A PACTORP

to its assistance, the Corchosloration Covernment adopted a firm attitude, and during the summer of 1938 a general I- uropean war ecomed almost certain Czechostowski waz now society uresterod, and a propaganda campauga sgames that unhappy country was soon in till sang were being mistreated. The British Government dispatched a commission to study the question Since France was pledged to ome

#### TOR CONGREST CZECHOSTOAVEJY 12 "SOSIENED"

other forms of foreign exchange acquired substantial amounts of gold and panks of the country were looted, and taitler many of them died after brutal abuse The nerded into concentration camps where ing two days, more than 50,000 persons uere critics were , burged , or the opposition Dur ince of Germany Vienna and other Justrian try no longer existed it became but a prosgare in and Austria as an independent counstatted marching The Lienna government the vote was taken an armed German lorce (Reneral vote) on the question but before tor connent in renut capied for a piebestie ad a tuding a ho wanted inschins Ihe TUSING WITH COMMENTS THERE WERE SOME 13demanded installast, that is the joining of move tusting was the lind tectum littler

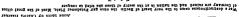
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And we German, bale deables, brain of hat, or halfor up and a chargo and and a chargon a chargon and a chargon and

world war 1959 to 1645 and 165 the control of the c

ntself forward. Its leaders lived thought and the Cerman states Prussia began to shore son when Aspoteon's sun had set one of time were gobbled up one by one by Aapo grates disagreed and fell apart again and in Koman Empire As the centuries passed the themselves under the banner of the Holy tion You have seen how the states at gred -o rab suoigitat gainagaab a bas gainteal bas STEES DECOUNTE STEES WITH STOMING WESTER Italy and Trance and the German tribal natched civilization move northward from boring tribes to the north and east 3 ou have the cirilized norld of Rome and with neigh tribes at war with one another and with pave seen in the ancient days the Cerman portant events of Germany's history You We have in these pages told you the im

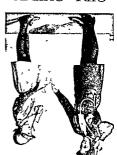
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aken the same Promise at their enrollment and have pledged themselves to do herr best to keep the same from point Law In whatever country they may be, you will find them camping hiking singing and learning

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By K Madine Corbett

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to nappen in any lower or latest at the course of a state of the course of a faster prefer to specialize and become Set Rangers These girls are particularly of the valet They are organized as the crew of a stap and their Guider is a state of the course of a stap and their Guider is a lost and in the course of the course of

An explorer or a promeer must be a brank and resourceful person and so the Ranger must train herest to meet every kind of emergencies that emergencies that happen at home and the ones that are likely

The standard of the standard o

the big sisters of the Girl Guides are the ladies who were sewing there cuteduct needles and loaded pin cuspions for down to their local Ked Cross workroom and ter much mistaken These Brownies went or province proved that the grownips were person or uld do in the war effort. One group that there was not much that a Brownie ago the Deginning of the war grownups thought the people at home pleasant surprises At Brownie-they are always learning to give the things that are such fun about being a er guis to know how to do That is one of which older folk do not really expect young, sa well as hundreds of other useful things suonna do was bar salbasa beard of sginti team to wash the dishes to make milk pud do a great many secret good turns. They the good turn every day but most Brownies brownies like Guides are expected to do

promise as the Cutode Fromess, pressure the grifts when the first the first the first the conbut as uniformed the first the first the first the does not be first the first th

Tries Birmnies belg Mother with the belang



chance to bely build a better imerica biscice To sil gitls who wart it it gives a hone of Gul Scouts are now putting it into in in severa to englicen years old and inil a plan of work for soung tovercan guite by American Curis for Inscrican Guls ft is called their plan / Design for Citizenship taut the of what they wanted to do They ice city scores and want city scores made By means of a nati h wide survey, Brown given an of portunity to preduce the organ entire membership of the Girl Source was saults make there decisions but in 1945 the etts up for usell a plan to nort Leually varion decides upon Loais and pregrams and I ractically every forward looking organi-

means of co-operating in building a lasting oue sien senser to descuss was and tration Older Girl Scouts held many conter Astrons Relief and Rehabilitation Adminis Aurse Corps in its campaign for ince nurses and helped collect clothing for the Cnifed on for that agency They aided the truty the nation wide chipping service they carried estations from the Treasury Department for In 1945 thousands of Girl Scouts carned aid of children all over the norld

kneudship kund which is dedicated to the contributed to the Juliette Low It orld and times to combat erosion All Girl Scouts cutting down underbrush and planting trees Scout Ranger Aides nere able assistants in Forest rangers found that Senior Girl

tutions which needed Scout services tient to should the ne bine eartreeting statispool years old worked on farms and as aides in tope petrot Cit.] 2conts piteen to entricen ties in doing a great many different kinds of sold war stamps and helped their community Girl Scouts salvaged materials bought and their mothers. The ten to fourteen year old war stamps and did odd Jobs at home tor to ten year-olds, helped in salvage bought nce during the nar The Brownies the seven vies testinules to exuod coo,coo ça te bressi Scouts in the United States had rolled up a By the time Japan surrendered since Pearl Harbor

ytmost 200 000 Bitls pane lowed the 2conts or these things by joining the Giff Scouts and to be useful too Many have tout d all rean guls want to have tun and good tunes Like these Brownies milhons of Ameri of the most popular volumes in the library of Aledford on the shelves and it became one the children's library it was the only history them in book form and gave their book to man) tracels about town Then they put what they heard read or san during their the brownies made notes and drawings of

tell them about days gone by upon the old folks of Medford who liked to rust tind peen parit by sinces. They called indian settlement. They climbed over a wall nist nomes and torts and the site of an old ago by a glacier The Bronnies visited colosests that had been made many centuries medicard s field their reader showed their Of course their trox p leader helped them, On all about Medford from its very beginning their library So they set forth to find out was no published history of their lown in years to come They discovered that there town something to remember them by tor These umeteen Brownies had given their done that was so important?

Cut Scout Brownse troop What had they zine as nell These young girls belonged to a the town of Medford but in a national maga m Aino for entitoted and bistorians and the entitle storibus en old who suddenly tound themselves praised a group of girls from seven to ten years P in Mediord Massachusetts there is

Wall JounA

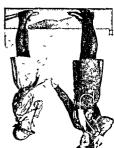
Brownies promise is not quite such a big Brownies motto is Lend a Hand a brown uniform with its own badges The bitthday, may join a brownie pack and wear Any gul, once she has passed her seventh are divided into groups according to age younger sisters called Brownies? The Guides Did you know that the Girl Guides have

Camping Dieing singing and learning conntra they may be you will find them to reep the same ten point Law in whaterer and have pleased themselves to do their best taken the same Promise at their enrollment

VII OI the Buis in this huge lamily have on the Guide and Brownie in the picture Cirl Cuides wear the uniforms that you see dies white uniforms are worn In Canada countries such as Brazil and the West In not the same in every county in very warm Cut Scouting The color of the uniforms is City Carding In some countries it is called chain around the north This is the chain of hood of girls which stretches like a

HERE IS a great world wide eister by K. Madine Corbett

CIKT COIDES



and special friendship ing feel for their sister Guides a very real

known the fun and inspiration of Girl Guid come into its ranks 411 those who have of Cuides and Brownies to others Jet to but also up and down from one generation bluom spreads not only around the world or Ranger companies Thus the chain of come leaders of Brownie packs or of Guide Many Gul Guides when they grow up be-Builegiven tol Viezzoon 21 1Edi

handle a boat and to know the weather lore their Slapper They learn to swim and to as the crew of a ship and their Guider is tarty fond of the water They are organized come Sea Rangers These guis are particu Some Rangers prefer to specialize and be-

to nappen in any town or viusge happen at home and the ones that are likely emergency-the everyday emergencies that must train herself to meet every kind of and resourceful person and so the Kanger An explorer or a proneer must be a brave

one is both an explorer and a pioneer blion isbun sold out into samoi i bas wall tical knowledge and the Guide spirit of her age of the eaty one is asked to carry her pracmore than fourteen years old and under the more useful citizens The Ranger is usually Brownies and Gitl Guides really make them brose that all the things they tearned as called Rangers and their special job is to

the big sisters of the Girl Guides are the ladies who were sening there. threaded needles and loaded pin cushions for down to their local Red Cross workroom and tery much mistaken These Brountes went of Brownies proved that the grownips were person could do in the war effort One group that there was not much that a brownie-age the beginning of the war growings thought the people at home pleasant surprises At Drownie-they are always learning to give the things that are such fun about being a er guils to know how to do That is one of which older folk do not really expect Joung as well as bundreds of other useful things dings to thread needles and sew on buttons learn to wash the dishes to make milk pud go a kiest many secret kood turns they one good turn every day but most Brounies Brownies like Guides are expected to do those at home

spe will pelp people every day especially do her duty to God and the Ling and that Empire promises that she will do her best to bit as important. The Brownie of the British girls who take it are not so big but it is every bromise as the Guide Promise, because the

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Sharm at Controlled at American Strategies and Prime Minister Machanic Machanic Colors & Controlled Strategies Machanic Machanin Machanic Machanic Machanic Machanic Machanic Machanic Machanic



the fan Francisco parier

The Village County of State of the Churchill and Predesty Statells meet to take the Prince Milater Vinaten Churchill and Marabar joegde Statel meet to take the Churchill and Marabar joegde Statel meet to take the county of the county and the surround them bets about weigh affairs. Top diplomats of the three countries surround them bets



SLYLESWEN OF THE ALLIED GOVERNMENTS

[ 191 ]

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Canada had a brilliant conerni dier in Lieutepant General H D O Creter





The unconditions! surrodor of Cremary to De Allier is recorded at Retine. France on May 6 Nant Chief of Staff Colonel Oceasial Outsal document. of the German delectation puts his signature on the official document.

Lean Army Air Forces.





The American Chief of Staff was Central of the Army George C Marshall. bene at 10 the about Dwight D Elecubower is Ailled armies in Europe under headed the Allies











HISLOKK-WYKFKS OF WORLD WAR II



SOLDIER AND SCIENTIST SHARE VICTORY



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DUSTICE OVERTOOK THE AXIS IN 1945

All this does not mean that an outsider shown on make money on memor inventions I however a man, in fact several of them, who have a man, in fact several of them, who have a man, in the control of the proceed money from children's toys. These mrentions were, of course, not teally "inventions were, of course, not teally "inventions were, of course, not teally "inventions were, of course, in the man of the process of the man of

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Come across them in the course of his regular work

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### HETSE IN MEZEVECH

## ENOWIEDER OF SEVERAL LANGUAGES

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could not have changed over to a different field, and have been successful in it, if he had not had thorough scientific training to begin with Elegt success the bomt is that he will later change over to a neighboring field hed received his main training tor one held nem s Jad sandqen nalto 11 no os bas ation engineer has to know meteorology, ofpet uriga spete q) estates are need yn 3A1-10] E MOUT OI aven osie min sand or paisa fields A chemust, for example, who is infer-Ruinough with otten extend thto neighboring mg you can in this particular field Such field has been chosen, is to get all the trainist he pages long. The next step, after a or electronics or applied biology or chem-Rorult to micrest plus it might be aviation, st play unique puttu sig da ayeur o, Alchuis The lifet step for a coming inventor is

#### IS RECESSURE FORD SCIENTING INVINING

gratical (15 po-shift per cellulars, T There examples chow the reasons n by the consensual manner of toda, has to be a professional man actively excepted in the field can be (11) when the preceded, and only when he is trained can be uneeded, and only when he is trained can be uneeded, and only when he is trained can be to the consensual manner of the profession of

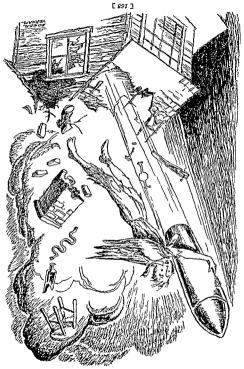
viany incentions are defended on highly specialized training. For instance, the first bared of the chemical which was developed into ny lon was of such a nature that nobody but a professional chemist would have rec

In the electrical industry. Determine was a big problem for semente more to make as a big problem for seme time to make the certain state of the electrical industry, would not a race during the electrical industry, would not are found as to have former and the first three as what the time and the first three and the certain semental the make the problem of the pro

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SURPRISE! SURPRISE! FOR GARRET GENIUS!

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next stop started Gamma by the next start of metal—fet us say. Jonnel V. Then metal connect does not start of metal—fet us say. Jonnel V. Then metal connect does not start of metal persentant metal metal

The machining of the rocket motor is the

of the trade done, he watches and picks up a few tricks after all However, while the nork is being gires the work to a commercial welding shop rums his first set of tanks and covers and \$120 tot it Not being too good a welder he a welding outfit at a bargam, and pays about a weiging outht He is lucky enough to tind \$30 for the work or whether he should buy a commercial welding shop and pay around the the should give this welding job to welded on, and the question comes up speet aluminum Any the covers have to be tengths and cuts and pies the covers from pe care pre synustration taping to brober files, pliers, screwders and wrenches Now tor nand tools, various kinds of hammers, He ocurs with an outlay of about \$100

MECESSARY TOOLS

him and pay a let fee Garrel Cennus, m order to save time, sight and pays the fat fee, ordering the hot bus book. (Cheap, tool) Affect that be goes to work. the first financial sethese of \$500 or so olong everything himself—after all he does older people.

Garret Genus lass has choice. he can at tend college for a year or two (who has be not done before, deciding to become a great my early or meteral) and acquire enough math menter and physics to make the calculation hangel Oc, he can find an engineer or an eignnering firm to make the calculation of

ceanonal estimates to settlement and the ceanonal settlement and the set

In ancient times a simple pit was used instead of a timatee. A crude form of believe made from shins furnished a hisst of air strong enough to morease the heat until the metal metted. Low walls of clay surrounding metal metted. Low walls of clay surrounding

sary, as we shall see make it more useful, other processes are neces unprove the properties of mon in order to principle of the great from industry, our to This operation is called smelling, and the product is pig iron That, in short, is the main non sinks to the bottom as a molten metal cathon combine and rise as gas while the neated to the proper temperature, oxygen and core) are placed together in a furnace, and carbon, so when from ore and charcoal (or primed soft coal) are composed chiery of cost (barny purped 1400d) and coke (parny torm new compounds with the carbon Char AM IIA ILOU ITS COMPINGTION AND ILOU BUG ore at fairly high temperatures 'I'ne oxygen Carbon will take the oxygen out of mon

ore conference in the conference of the ment—annest surely with the conference of the ment—annest surely with oxygen to get ment—annest surely with oxygen to get

Iron as almost averer toward net be pure, or messilar, state sithough meteorites of tron messilar, state sithough meteorites of tron form of the search was messilar pack where he tron of the search was messilar pack where the tron of the search was state to the grant of the search was all in the bot gaseous, or moliter televance of the search was stated to the search w

of which the world is made. As you know, some of these elements are metals, Gold, arter aliver, copper, un, sinc, lead and so on, are metalic elements, and tron is another

Amone the open commonly and acceptance by a done the commonly and acceptance by a done of the commonly and acceptance of the commonly acceptance of the comm

# THE MONDERFUL SIGHT IN THE GREAT FURNACES MAKING IROM AND STEEL

Blact furnaces at night, ploreing the darkness with their darring glow present an uniorgeitable speciacle



The region of th

#### NOT MADE AN INVENTION BASEMENT BACHELOR STILL HAS

would on from the Box 200 and to make the state of the st

elor orders material for the test stand—a lot of angle tron for the framework (\$50) half a dozen gauges to measure presentes at vari ous points (another \$50) and miscellaneous material amounting to about \$100

Two weeks of making diswings for a test stand are the next step They are followed stand are the next step They are followed thousever these eight weeks do not cost too much morey to die cost too much morey of this period Basement Bach I the end of this period Basement Bach

## LINE VAD MONEY

the necessity of testing his rocket motor cast but he discovers that he forgot about now he begins assembly. That is fun and nachelor will worty about them later Kight ph prince garges and calves and Basement drill press Future froubles will be provided 120 but it is a nice sturdy and accurate rescueror orders a drill press. It costs about quit is but awar on the shelt and thasement trill for this cheration Reluctantly the \$50 are stead, and strong enough to hold a hand shand a chodon ylashnutroln J drow sidt is peantiful electric hand drill in anticipation Breement Bachelor has beught himself a pe quilled Cornel Ceputs who has become The next step is that certain holes Lave to spulspicite on entral long retracteds tontrac we'll assume that our friend Garret is a per some time during those eight weeks but

rule the would be inventor will give up at

truggle with machining operations is a

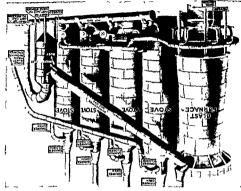
atomic bomb, required one of the biggest in present war, but getting a usable result the was a very new field at the beginning of the simble list because it is new Atomic physics you don't think that something has to be familiar with what the others have done practices first, and 5 ou have to be thoroughly to unprove you have to know the standard bractices or the work of others But in order of changing or unproving upon standard lost of the work of meening grows out tine work is too dull to make a good story ten up in books The much more fruitful rou and because they are so rare they are win But such fundamental discoveries are rare between a horse stable and a potato cellar

Cecusar creamer Consequent of the conconcurred to the publication of the conconcurred to the publication of the conconcurred to the publication of the contraction of the conpublication of the conpublication of the conpublication of the contraction of the conpublication of the conconcurred of the conconcurred of the contraction of the contraction of the contraction of the conpublication of the conconcurred of the contraction of the co

have known that team work is what really citities, at his disposal he would not have did not have these things usually called in know how to handle the equipment It he have had the services of tramed men who entitic metricion, at his disposal He would spob capet of a commercial tem or of a sca nad a tully equipped taboratory or machine not even reach that point) He would have red information (Basement Bachelor did He would have known where to find special pare prount in many cases, what to expect Basement Bachelors mistakes he would different Aot only would he have avoided gin with things would have looked a lot if he had been a research engineer to be

## TODAY S INVENTIONS ARE THE RESULT OF TEAM WORK

beginning work on inventions of his own blut he does have the beginnings of a nice little machine shop, and if he is wise he'll have himself a professional machinist and gonote fusioness AD OF IN Short some Assured to the contract of the contract of



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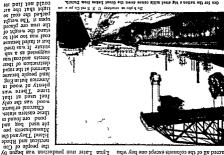
One would entirelly expect the room on of an electric the control of our darket by the beat of the control of t

deep in some places
in the cars These pits are three hundred feet

proceedings of the State of the

ask through from a measured the could not burn the country of the country of the country of the fact mounts of the country of the country of the through of the country of the country of the public of the country of the country of the time cotes Three country of the country of the time cotes when the country of the country of the time cotes when the country of the country of the time cotes when the country of the country of the time cotes when the country of the country of the time cotes when the country of the country of the time country of the country of the country of the time country of the country of the country of the time country of the country of the country of the time country of the country of the country of the country of the time country of the country of the country of the country of the time country of the country of the

Oto 10t the nation s dig steel mills cames down the Otest Lekes from Duluth.



sacred all of the colonists except one boy who Chet Opechancanough and his brayes mas nace was scheduled to go into operation town Virginia On the day that the blast fur I sil ng kiver sixty six miles above James men built an tronworks on the banks of the in the year 1622 a 1 tile colony of English

be hammered into various shapes leable that is it can

tem bas flos si fud peratures are bigh furnace where tem our modern blast mot 1 ke fron 1rom NIED IOW REAL IT IS Defilem is anelted turat implemente hnives and agricul ineir spears axes making the iron ior such a furnace for asu ikus səvirgu əvili and Alrica the print rest to salgant and al intrace was made er and the shaft blast ot clay became h gh together The walls done anay with al later the pit was pure 11 on pappe A



Charcoal or burnt these eastern states. ni bruot sto briog pure floq pasn aid yrassachusetts peo siz bus yan i' busisi necticut and Rhode

of the Saugus River near the present city of

fully Production began in 1644 on the banks

was the first colony to produce from success

ruins, But no iron was found. Massachusetts

as fragments of slag or emder were in the

me bit were present TROM AND STEEL

## TAPPING THE BLAST FURNACE



And the state of t

iron became botter they absorbed carbon from the charcoal and subcon from the stone-the impurities in the ore. Iron containing these elements is no bonger malleable and bard to fuzz, but brittle and easily melted Instead of

duced a great deal of heat in the furnace ore went on as before, only faster, but when the globules of

The blast furnace in the fact furnace in the state of precess of making precess of making the fact furnace and fact we have furnace fu

of the manufacture of cole cole us aby product in the man utfacture of coal gas, made as a fuel for mode as a fuel for

The obeproduced over a to do by yoodurel overs as to doeded and taken to the plants. The gas and taken to the plants are seen to the plants of the plants of

nestrument cases and automobile panels and a thousand other articles, saccharine which is at three hudted times as sweet as eugat, dyes, meet cones and even per fumes

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Distrement of a barrawine of a contract lates of a contract late of a barrawine of contract o

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ENGLAPORE AND STATE OF THE STAT

microfiles, and a page 10. The most surprisand other apparatus researched from the crude tar musture. There are ammonium sulphate, for fertilizer, berzol to must with automobile gasoline, tolinol for explosives, naphthalene to

At the coke plants and others are stuls, services, sometimes towers and other apparatus.

ser bon sucomins coal, but recover gas, to not jed avod signi and not only make gas from the coal atest that district the tures of firebrick and very intricate struc nct ovens These are are caued by prod began to build what teenth century men -auin ant mi aisi os 'jnjesn og pjnou 31 STSUM STSHOOT intraces and under m mud osla binow the coke ovens, it to edor our re uma DIROM 1803 mond Of course, 11 gas

navo sur nas allowed to enter that not enough aur gen uing ton bib that all of the coal the oven 't he reason to dot and its mud WAS CHIVED OIL TO tust cost contains burned and the gas part of the coat cost but in A suisil enarge to agricult trom the previous white hot enough Allensa dol aux charged with coal at Descrite orens were and bed beds a video the ancient dome its resemblance to doubt suggested by on sew navo and oven The name of CHILCO & DECDIVE COLE COPEG ID MUSI 13

Secretary of the story of the coal mass partly due to the making of coal out of coal partly due to the making of coals out of coal mass coals out to the coal mass of the coal mass of the coal mass of the coals of

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MAKING ELECTRIC FURNACE STEEL

farmace remains in blast day and night for either molten or as a gas Once lighted a blast gaetarnud but in the furnace comes out

ser eral years

cinder notch, above the non tapping hole at intervals through an opening, called a and floats on top of the tron Siag is removed called the non notch. The slag sinks down drawn off at meervals through an opening the bottom of the furnace and is tapped, or Innestone, and so on The molten non such sto coke, a layer of fron ore, a layer of lunestone, then one of coke, one of fron ore, and one of Now the blast furnace receives a layer of

The blast furnace has now grown from the

curet impurity in ore pecause time comb nes easily with silica, the on top of the molten won This comes about nuccione in a mass called stag, which hoats the furnace, the unpurities fused with the imescone were added to the ore and fuel in in the early lurnaces it was found that if

thought to resemble a family of pigs tunner called the sow and the whole was molds were formed on each side of a central sand molds. It was called pig from because state, it ran out as a stream of not metal into pend and out from the furnace in the solid

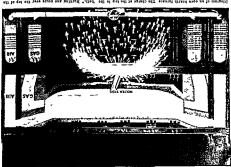
mro bots and other utensils, stoves, frebacks lem was created Some of the non was cast could not be forged or welded So a new prob made an iron that was brittle, of course it ource the blast furnaces as they grew larger watch everything about the lumace

watch the quality of the non, in fact, they the temperature of the blast, watch the sian

now it works The men who operate it waten The diagram shows the blast furnace and the industry This practice is dying our of the owners The Eliza, Carrie, Lucy and Isabella furnaces have been nell Laorna in

tere named for nomen, often for the wives coont a blast furnace Not so long ago they happen There was always a little senument trot the operation and such things very rarely side Now the engineers have learned to con sub and seatter ore dust over the county or it might freeze Sometimes a part nould undependable, it might refuse to make iton the last few years the furnace was sometimes s rery complicated apparatus Until within the equipment that goes with it have become the bottom or hearth. The blast furnace and a diameter of as much as twenty six feet at a stack about one hundred feet high and to little run of clay around the top of a pit to

Diagram of an open bestib turnace The charge of the top is the 'beth.' Burning gas pours ever the to time to bein, burning away the impurities in the motal. Ihe dow of gas and air is teveracd from time to time



nest the inconnic at The open bearth charge is not only molten from like the charge of the Bessemer con verter, but steel and tron scrap as well Serap is metal that has been used and partly worn is metal that has been used and partly worn

mon, for about fifteen immutes, then the at one end of the furnace across the molten trot patured gases pass through the checkers sometimes the fuel under the charging floor checker chambers for healing the air and sucped tool with uptakes on each end and IMMEGES SEE SUBJIOM DESTINS COVERED WILL SIX the steel is more suitable for many uses. The controlled more easily than the Bessemer and upon the size of the jurnace, but it can be special purposes. The open hearth heat takes eight to twelve hours to make, depending muri now ressemen steel is used only lor ever, it cronded out the Bessemer process nee" to year it did pecome earanneued, now brocess, was slower in coming into general vented about the same time as the Bessemer

# The open hearth furnace, though it was in

As you can see, substances see, that proceeds to address a see, so the process, the process of see o

the more than the state of the

turge of those over the regime to begin the regime to be subtional regime to be subtional regime to be subtional regime to be subtional regime to be subplied with the regime to be regime to the exhibit a plante for the regime the flaw. If you are the regime to the regime to the subtional regime to be regime to the regime to be regime to the regime to be regime to the regime of the regime to be regime to the properties of the regime to A Beckening converte from how as one of the most glorious sights in industry. The vessel is turned on its sight, and industry. The vessel is turned on a fadic, and have not necessel is there as a fixed burst of flame and At first there is a great burst of flame and adolpting sparks. Then red forom fumes with

### RIEFF IN Y MODERN BERZEMEN CONAEPIEN MOM MOSTER INON 12 CONAERTED INTO

and numbs away the unpurites. of the air unites with the earbon in the front metal in the converter, or vessel The oxygen through the tuyeres and through the motten containing small noies A biast of air is lorced tachable and fitted with tuyeres (air pipes) neight, and can be tipped The bottom is detrunnions (picots) shout halfway up its end, at the top, open It is suspended on of Engantic bear spaped bettle with the small the modern pessemer converter is a sort step in the history of the industry was taken now with sit ... He and so and thus the Breatest y will burn these impurites out of the motten parities removed and a bille carbon added. soned , steel is only cast from with the un-In 1854 Henry Bessemer in England rea

of high and the classification of Shefffed, budgind, needed made budgind, needed in establishment of the classification related in a mail of a classification of the classificat

non nortex of those assistance and the current of the control of t

packs up de charcoal used for heat and becomes steel of a fair quality. It he greis tred of blowing his lorge and rests for a little white, the etter absorbs more carbon had becomes harder. Threse processes are basis of all modern trop and steel making

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to see the important process of forming—that is pouring molica silest as and taged mold. The mean is the picture is falling a big spoon with molica is noted to see a sample in forming purposes. Both photon courtesy U S. Seed Corporat on



stuf, Toursop se paytow pure non that remained was rolled ploom the essentially pure adi to suo bessemps sew and other unwanted elements carpon. поэты Заплы soo bonuds blost of the siag bloom, weighing from 150 to iolied mto a ball called a spongy mass filled with liquid it Eradually became a hot with a long bar As he did so, der kept suring the fron resurp y man called a pudmass of pig iron on the trom the cost passed over the potter the burning gases plast furnace. As the fire grew stead of undermeath as in the The firebox lay at one end in nearth of another furnace ro miolisiq adi no juq from the blast furnace was process Pig tron as it can e tron This was a coal heated

that he can hammer it into tools. The iron torge like a blacksmuth s fire to soften it so from the small blast furnace, he heats it in a non to dum sid smeado dot aged no benoti absorption of carbon After the native men

Steel 15 a rather pure from hardened by the

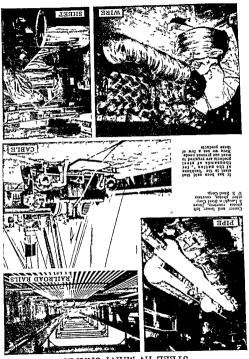
were made of smaller articles bibe and countess IIAGE' CUL UNICE bridges, locomo Kails pansti became well estabperiod before steel ant in theirogen Vevertheless it 4.85 present time small scale at the produced only on a Prought mon is meented later making processes inproved steet torced out by the sew il abem it nrought from that to settifenb pood our Zuipuers HOLWICH auoă

furnace has about Suppord out uon ras called wrought

furnace for converting pig iron into wrought In 1784 Henry Cort invented the puddling needed, and before long it was found into a malleable form, for nider uses, was

nut a method of changing the brittle treat and the little machinery used in those days (the back walls of furnaces and fireplaces)

wrought fron in the nuneteenth century The Bestsemer process The big bowls containing the charge are called converters



SLEEF IN WYNK SHYPES

[ 721 ]





Befo a steel Ingots a e rolled they are heated white hot in y t furnaces cal ed socking pits.





I ROM INGOT TO SLAB OF STEEL

its mold it is almost always rolled A very few are forged under a press mto beavy armor plate and large shafts.

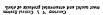
mportant steet products. They are used for rathoad care, locomotives, steamships, heavy machinery and artillery Cast steet has almost for the product of the machines. After After the ingels is formed and stripped of

the other electrode, chair censes the gap of an, from the electrode to the change, and again on the retirm nouncy, sperks are lamp. The tighter grades of tool steel outlet have and standers and other special aloy steels are made an the electric turners. Steel essuings are loadry one of the most Steel essuings are loadry one of the most

gamood of an bellors are you'll road? Lobisade seeks to ayaind amood oi lim ganddake yo said on a said an ayaid amood oi lim ganddake yo gang chabin, againg chabin said na said an asaid on outga bello on diur han a said na saidi. An ayaid pohin, againg chan yo' saidi quan said on talim an ayaid ayaida ayaid

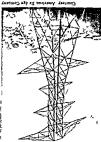
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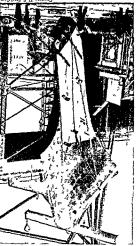
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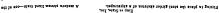
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#### [ 921 ]

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except the finer grades of tool steel and stain for any the mild to be rolling thousand uses Steel for practically even thousand uses Steel for practically even the property of the property of the stain stain and stain and stain the property of the rolling the stain and stain and stain and stain the property of the rolling the property of the stain and stain and stain and stain the rolling the rolling the stain and stain the rolling the rolling the stain and stain the rolling the rolling the rolling the stain and stain the rolling the rolli beams, plates and their are cut to measure. The open hearth luct as and, at on il I is may be part of their are such as made of their are their are the cole of their of their are their are the cole of their are the made them only and their are their are the made them are the made the made them are the made

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## TOAE' CHYBILS OF EIRDRESS

his after Japan was conquered in 1945, Japanese thinking began to change 4t last the emperor himsing began to change 4t last his emperor false

Stop for a moment to think what that that accurate the grower, and those who represented him in the government, had absolutely unfunited power over the people Body and unfunited power over the people Body and the appearance were bound to the employer.

beson "The se what National Shinto says "The protection and the advancement of the order and the care of the ancestral spirits and their power resides in the emperor."

and tol any or each subject to the emperor nuith of the nation through the obedience nonal Shinto He purpose was to preserve the croment has maintained a cult known as Na pag made use of them since 1808 the govmore recent times, the Japanese government All of these beliefs are very, very old in situde to stuppusosen out on of Attendanta nation a people who considered themselves ant of the Sun Goddess, bound together as a nation The emperor, as the living descendgoddess of the imperial lamily by serving the o cach Japanese was taught to serve the serve his family god by service to the family, ust as each family member was taught to tamily took the place of the family god And lensom an to esablog add datemed vit tern The emperor took the place of the fam

rule, that of lumsell as emperor. Jumus was thus the first emperor and the first human ancestor of the imperor and the first human fine, the matter as a whole became or fine, the matter as a whole became or fairned very closely after the old family par-

The United Among are more memory un multiary cocuptions of Japan One of itsets most use of occupations of Japan One of itsets most use of occupance of the properties of the properties of the occupance of the oc

Lind can not progress it feligion is used by government to control the thoughts and actions of men But in Japan, religion has been a tool of government.

the character children and government a sumpty in the old Japanese word tor government means' things that have to do with working he in America and Europe hold that man but not hold that man but the present of the first party but have the first man but the man the man but the man b

The Japanese have never drawn a sharp taith of the Japanese people has been a sort eight centuries or more, the great religious to bue field in blot min soot members were willing to believe in Buddhism too 50 the Japanese who had believed in Shinto only their names were different After that nuddas, that is, periect beings, and that proclaimed that the gods of Shinto were true and of its strange gods. Then a famous priest tuck would have none of the new religion their ancestrat spirits and to their rulers that then old laws of loyalty and obedience to medicación but the Japanese were so used to ingit one econitionim ingit trons ingit right speech, right deeds, right livelihood and it consisted of tight thinking fight aims use of heart was called the Eightfold Path tite and to happiness in the next world. I his peld out to the Japanese a way to spiritual good conduct is in useli a good isuddhistra ustroom to Sumo budonism taught that BUCCHISCH LAUSHI MANY CHINES WALCH WE'R

## MINCLING OF SHINTO AND BUDDHISM

But sit to few because alone a first big an an organized government, with its own will a nation of (ribestien into a community with continent of Asia came to Japan, and changed Buddhism that the learning and skill of the had never before known 50 it was through tue Jahanese arts and sciences which they with which the temples were adorned taught gold and bronze vessels and the silk tabrics rempies and the making of the sculptures trom caina and Aorea to build magnificent Arusts, engineers and craitsmen were brought first and greatest period of Japanese art exist to this day from this start grew the disst monasteries and temples, a few of which the Buddhist priests He established Bud

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suis siu the god of storms was banished to earth for the near ena were brilliant with sunspine, but when Amaterasu came forth from the cave a strong young god should serve her and brung her out This plan worked beautifully, and wonth of the cave Then they planned that curiosity would bring Amsterasu to the bias ed beiore the cave, for they thought that be done They decided that music should be met in the Alilyy Way to plan what could dark The other gods were worried They self in a cave Instantly the heavens grew oun who was a gentle spirit, concealed ner storms was so unkind that the goddess of the treating his sister One time, the god of chievous He took delight in teasing and mis the god of storms. He was mean and misthis is her story She had a brother, Susano-o, gust Spirit who Illumines the Heavens" And o mirami which means , the Great and Au goddess of the sun fier name was Amaterasu the Japanese unperial family She was the A opier tells us about the first ancestress of The first history of the Japanese, the means the las of the Gods."

bod One spirit might appear to man as a spear as a mountain hooter spirit might appear as a tree This nature worship was known as knowdar as which means All that exists is hooted as a man a spirit man and a light of the spirit and a spirit man a spirit might be a light of the spirit and a spirit man a spirit might of the spirit might of the spirit might be spirit The second page of se

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horea as an ally of China was deceatated first by the Japanese in the latter part of the assistant horean was bount twenty for pears later when after when the and of China in her unsue cessful struggle with the Janchus These parts when the safe went to the safe of China in her unsue cessful struggle with the Janchus These parts when the safe was a safe went to be safe as a safe went to be safe as a safe went to be safe as a safe with the safe as a safe when the safe as a safe went to be safe as a safe as a safe went to be safe as a sa

service-by the conquerors need all know how hores was repaid for this to Japan by way of Aorea as a bridge We used and the Chinese culture spread slowly Darbaric state when China was highly civi nere is an itonic fact, Japan was still in a Aurean art architecture and interature Non and minin centuries were a golden age of was the chief religion of Aorea. The eghth Buddhism which came by way of China were educated in China For a long time cal sciences and philosophy Many Loreans Chinese art, architecture literature practi nte to pet' and was deeply influenced by Sears Korea was an ally of China paid trib nutil the tenth century For hundreds of into several kingdoms which were not united In tery early tunes Lores was divided pictures)

(A) red alphapets as Jon trook as to proceed to the content of the

most boostly stricken in the world and agriculture brought no aid to the hore and agriculture brought no aid to the hore

Of all Lorea's natural resources, water power is the most important. The nivers

in July and August

The climate of Korea is very much like that of the middle Atlantes costs of the eff United States But parily because of the effect of the mountains, most of the rain falls in this will be a some and around the control of the mountains.

one may not dee mountains after after a mountain mapes after a mapper, attentioning off to the fourtain of motion for extending off to the fourtain described in the createst of the fourtain of the fourtain

There is hardly any place in Aorea where railway system connects Seoul and Fusan on the southeast coast Part of the Aorean (Jusen) The most important port is Fusan, the western coast its port is Chemulpo center of the peninsula a few miles in from miles anay, along the coast to the northeast. The capital of Korea, Seoul 15 in the the Soriet's chief Asiatic port is only a few churia and the Soviet Union Viadivostok, north, on the mainland of Asia are 'uan east the Sea of Japan Ms neighbors to the the southeast horea Strait and on the THES WIDE ON THE WEST IS THE JEHOM SESS miles and 15 about 666 miles fong by 130 Japan It has an area of about 84 000 square dips down into the seas between China and norea is a long narrow peninsula which

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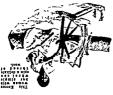
nt spe upland valley s nips and cabbage are grown in the north and wneat, corn, white and sweet potatoes, ter and millet, wheat, oats grain sorghum, buck summer Another southern crop is cotton water yield crops of rice during the humid north or, during the winter, raised in helds most important crop, barley, grown in the of it to eat Most of them live on the second nese, the horeans themselves had very futhe peen the principal crop But under the Japa Ruce, especially in the south, has long farms whole families depend for livelihood very small, under four acres. On such small much of its fertility Most of the larms are tor hundreds of years has robbed the soil of tion of the people But intensive currention mountainous, agriculture is the chief occupa

All of horea mas once hearly covered with forest, but it has been used masterially in the south In the north, however, there are still good stands of spruce, fir, larch and pune

been harmessed to any extent as 5 tet.

There are large coal reserves, much of it and harmerste, but there is no petroleum There are fairly large reserves of uno ore, mostly large reserves of uno ore, mostly of low grade as well as magnesum inhum alumnum, lead, zinc, gold, graphite and

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to establish its herriage of freedom Lawyers large part on the nork of laws ers who helped The greatness of the United States rests in niticent system of law

ment was not in conquest but in her mag

Rome ruled the world her greatest achieve great lawmakers. During the 700 years that senibing and drama. The komans nere also peace and to give us her superb architecture was able to develop in security the arts of world had then known As a result Greece and most democratic government that the of ancient Greece helped to build the tinest of Greece and Rome The great lawmakers closely related as ne may see in the histories profession for Jou Law and government are is another sign that law may be the right An interest in reading about government

and in their daily lives training is a great help to them in business iaw but nevertheless they and that their go through law school who never practice tesepes print to think clearly Many people it gives a student knowledge but because it reffer training is taluable not only because weakness in the argument of his opponent. up an argument step by step and to spot any Iv and exactly He has learned how to build able lawy er has been trained to reason close Law is a profession for clear thinkers An

ence of many generations growth and has been tested by the experi great body of law has had a long slow property after the owners death Every action it also supervises what is done with rues to enforce Taw deals with mankind in numan conduct that society recognizes and done. To this end law consists of rules of the way that society wishes to have them society and to see what things are done in The purpose of law is to bring order into KINDIN

tells us when we may tote and when we may may not own a dog that bites people Law they annoy other people Law tells us we us we may not play our radios so loudly that pow tast we may drive our cars Law tells the subject of a law or a ruling Law tells us on other people it is almost certain to be Prenerer something that we do has an effect Law is closely bound up with our daily lives one of the most satisfactory of all careers. woman who is suited to the law will find it On the other hand, a young man or young

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at the mercy of pannetaking opponents
These are some to the rescors why a law so enter the teston who are to enter the the teston who can be a law and the teston who can be the total before the manual the manu

Legal work that is done in writing midlided utaming will said contracts and making over income tax returns To do these things well requires both care and knowledge Cent is also needed in the preparation of a has ease. A lary set who is hastly or careless is usually

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A leany et should hare a stook body bedreat He should be bedreat bedreat he should be bedreat bedreat bedreat he should be bedreat he should be bedreat he should be bedreat bedreat he should be be be bedreat he should be be bedreat he should be be bedreat he should be be be bedreat he should be be bedreat he should be be be bedreat he should be be be be be betrayed by the should be be be betrayed by the should be be betrayed by the should be betrayed by the should be betrayed by th

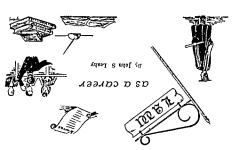
words boog are must be wide boog between the words boog at the most bund hand house special to the most as the sea as the

A lawyer must be well keep of some the must never the bard. Often a lawyer a work seep, the case on which he is engaged. A lawyer is not not often the case on which he is engaged. A lawyer is not not obtained but he is the property of the

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Every boy and girl in school is familiar with some of the qualities that a lawyer should have Eirst and foremest is a sense of honor Industriousness is very important and so is a fondness for studying

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#### RECESSERY TO PLEAD SUCCESSFULLY SINCERITY LOCIC AND PERLING ARE

am Font boms aill need to be unusually skillful in order to here a legal battle on your hands and you lin uo e ob ot tasm uo e tedar ot basoqqo ate there happen to be some able langer who will make it possible to build the bridge. If state legislature before it will pass a law that that benefit I ou may need to contince your need all the skill at your command to obtain which is inadequate or unsafe-and you may say, or a new bridge in place of an old one mer your continuous needs-the building Or 3 ou may find that there is some benefit time and chort to having that law changed not rep team to alove demunot bee seuten you too will find some law that you feel is

trom setting in Parliament It may be that

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went to England to secure them and per need of the services of skilled mechanics. He was tear of Russia it happened that he had reter the Great was a tyrant When he affermed trans travers

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nag no matter with what he may be charged that every man living under the American appear for such a criminal Senard replied bloors genders bus virides a brands to asm community was outraged to think that a eward appeared in court to defend hun Ame A murderer was on trial for his I le and

pagins sun uo Aes or peu Seward one of America s greatest law) ers you why you do it Let us see what, William become a lawyer if you defend a man be-become a lawyer if you defend a man bepersons who are guilty of crime When you stand how an honorable lawyer can represent thoughtless persons often do not under

with a serious crime the right of counsel was the hist nation to give a person charged represented by counsel The United States dud every such person has the right to be be innocent until he has been proved gund betson charged with a crime is presumed to In the United States and Canada every

rug nurt he must be mnocent. some other unpleasant ordeal-without get over these fiery implements or undergo dered to walk over nine burning plowshalts. The idea was that it the accused could walk ramons trial by ordeal the acrused was or do him physical hurt For metance in one detgo an ordeal which was almost certa it to unoccut The accused was ordered to un bredicament especially if he happened to be an accused person was in a most unhappy they called it trial by ordeal In those days not wish to resort to personal vengeance method of settling disputes when they did Saxons and the Normans adopted a strange or so many years was abandoned in able trial that had given so much satisfaction centuries after the fall of Rome the reason Itial by ordeal is a famous example For carrous and terrible injustices may happen " nen good laws are forsaken all sorts of

#### THE TRIAL BY ORDEAL A STRANGE WAY TO SETTLE AN ARGUMENT-

hanged on my return! sis Peter exclaimed and I will have them There are but three lawyers in Rus Buty puncts nere opposed to absolute poner in a ment He learned moreover that in tengiand hing Charles I to call a meeting of Parlia greatest lawyers of all time had compelled learned how Sir Edward Coke one of the Russia While Peter was in England he snaged 500 of them to return with him to

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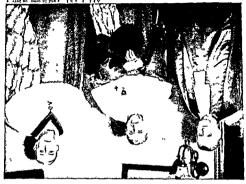
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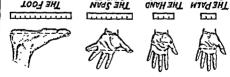
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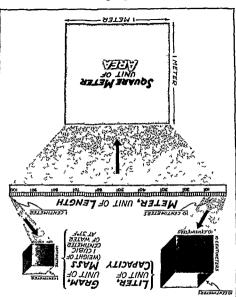
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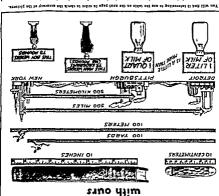
# The Meter as the basis of the Metrel System



called the hglt year is used. The hght year For particularly great distances the unit

and Measures Service, Bureau of Standards in Canada the Weignts unit is equal to nearly 93 000 000 miles, possible in the United States there is the weignts and measures are kept as accurate as adopted The measure called the astronomical ures of length larger than the mile have been be so long that they might well discourage even an astronomer! Therefore several meas

ment agency which has the task of see ng that every county therefore there is a govern nte ste spt to vary just a bit in practically other things with which we weigh and meas turies, the resulting figures in some cases would Now rulers and scales and contamers and It they measured distances only in terms of



How the METRIC SYSTEM compares

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to 14 but begins all over again with 1 ing spoce by baries corns, one does not go on means that when one reaches 13 in measur-

There are many other kinds of measure-000 muses astronomical units or about 6 000,000 000 second 1 light year is equal to 65 700 the speed of light is about 186,330 miles a -a really respectable distance, seeing that is the distance that light travels in one year マルベ

ments besides those that use have given here

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tamily The boy or gut who is looking for are able to work and earn money tor the they are sixteen or eighteen jears of age student's parents it means a great deal of This is a long course of study for the

assistant to a doctor already in practice ) ears as a resident in a hospital or as an a specialist, he must serve for three or more take care of them Finally, it he wants to be an internship during which he sees patients to biciciably eighteen months or two years) of non yeer that he must have one year (and he must have four years of medical educa that his real medical training begins i 1751 a bachelor s degree at the end of them Atter tion Three or four Jears are preferred, with and not less than two years of college couca school education a high school education ing At the very least, he must have a grade has to look forward to a long period of train doctors Bur any young student boy or gut States there are many successful women who wants to become a doctor. In the United Loday the way is open for any boy or girl

ресепте песеязату much longer course of study in medicine this great increase in human knowledge a gan to make tremendous advances With sciences abou which medicine is based be that germs cause disease, many of the other About the time when Pasteur discovered

ill in their homes already in practice to see patients who were and he would go with a doctor Then he would see panents in 25112511 the changes that disease makes in numan of dead bodies in order to see at hist hand student attended examinations of the organs worth had been scientifically proved The taken on faith rather than because their something about drugs many of which were carries out its functions lie also learned has to do with the way the body works and man pody-and a little physiology which anatomy-that is the structure of the hu rectly from high school There he studied common for a young man to go to one di old time medical schools and it was fauly to go to college before entering one of those century it was not considered essential brevailed in the middle of the mineteenth Let us see what kind of medical education

the country where all of the students are burg Ture is eine the outh medical action in ical College of Pennsylvania in Philadel women was organized-the Woman's Med sear the nist medical school exclusively for University College of Medicine The next Medical College This is now the Syracuse Elizabeth Blackmer from the Geneva noman in the United States was received 1849 the first medical degree given to a out gradually the number increased in s 1ew courageous women attended them ment students were young men At hist only of medicine and by far the greater part of Atter a while there began to be schools

girls were not encouraged to enter this prodays there were very few women doctors for doctor who was already in practice. In those high school and then he studied with a cation He went through grade school and wanted to be a doctor needed little edu

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An old time country dectors office

imerican Medical Association FULLOR JOHLHOL OF THE Morris Fishbein, M D

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Medicine



Harrey Cushing most francus of bram sur cine is one of the oldest of professions Dr peen the same for thousands of years Medi The seeds of the medical profession have

or an opportunity to practice biolocif dualified can be reasonably sure from a good medical school and who is eateubang one memoer to mem gano ( ant , nos needs of the nation for doctors For this rea cine is seldon more than enough to meet the tendance, the number of graduates in medinecause the medical schools limit their at he best qualified for the study of medicine choose the men and women who seem to it means that the medical colleges may schools this is probably a very good thing than can be accommodated in the medical decide to undertake the study of medicine to be doctors in fact more ) oung people of young men and a number of women decide work and expense involved, great numbers Every year in spite of the time hard

arents parents nhile for a voung man to be dependent on clothing food and sheller This is a good pools He will have to be provided with test school He will need money to buy the costs of his tuttion in college and in med expense to his family, which will have to pay to earn money while studying He will be an ward to a medical career will have little time

ever, the voung student of Idjands D has bad the in parters in grader is Tix's), have em i Zuttagen far Sattadip Janen ... ine m men sums p set to thed set e transmin fre Es pientibre, et the bient in jet tur bit more, He was taught the actions of the but but here told to but and but all eldens courtined with the simple reactions which the physiologist of an earler day was

through purertal memoral ex time of the tivotes of the tests as wen the naked eye and he also studies the struceinques tine ettretme se it enu pe seau pi days account termest business board to kin b a the rough understanding of the mecology insteady offers has the chance my pure Admograf Canons fud fampene medicine, he concentrates particularly upon Once the student reaches the study of trand on ones fert and speak are required and composition and even in the authory to metherne 40 coutrees in English Erimman one's self well is fundamental to success in grounded in Latin The ability to express ns is terently hanch the must be well to acmind to dant the eagen and dance enters medicine must learn to read easily thermore the joung man or woman who equally vital to a medical curneu um fur dependent has come to be recognized as nes, upon which the science of physics is so are fundamental More recently, mathemat giology physics and particularly chemistry which help to develop his scientific sense and in college he should choose subjects some courses in senence. Both in high school medicine it is customary for him to take (pnjs of suithog uostad Puno ( e atojaji

of their occupations reat suitable diets and care in the selection pealthful lives with sufficient exercise and that his patients understand how to tive positin advicer it is his re-ponsibility to see nosis and treatment. The doctor is also a rice of pignit scientific techniques in diag a phy sician must also be skilled in the prac in achieving excellent results. But nonadays even today such confidence is of great value their patients taith and confidence and past Thysicians have always needed to win and more scientific than the medicine of the Medicine today has become more exact the exercise of talents

subje opportunity for happiness and for with a modest income will find in medicine altaid of hard work and who will be satisfied is possessed of a spirit of service who is not head, a good heart and skillful hands, who geons, remarked that anyone with a good supplied The insulin does the work which the pancreas should do

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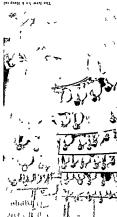
buystology atrition has become a tital science of nutrition which has its basis in this knowledge helped to develop the new or calcium and phosphorus results in rickets neutritis and a fack of vitamins A and D or sym a lack of thiamin leads to beriber of with disturbances of the eyes and of the associated with scurvy a lack of vitamin A diseases for instance a lack of vitamin C is or proteins in the diet leads to denciency certain vitamins or of certain mineral salts such apparances to the diet A deficiency of man sometimes tails to secure certain neces however that as civilization has developed Vian must eat to live We have learned specific biologic remedies and the antibiotics ogy and serology and the development of the development of bacteriology are immunol inndamentals of this science Related to the day every medical student must learn the angues came the science of pacteriology to shows pie tor intectious diseases from these spowed that there are germs which are rediseases rose from specific causes Pasteur on man Gradually physicians learned that

expression of some action of a higher power

II WAS ONCE TROUBUT THAT ALL DISEASE WAS AN enects against intectious diseases. deadly germs in this nay they exert potent antibiotics prevent the growth of certain which are the secretions of living molds. The Lese meinde penicilin and streptomy cin c ne we have the wonderful new antibiotics nally as the great trumph of modern medi against mumps and scarlet tever And, n need against smallpox and the moculations antitovins against diphtheria the vaccine edies and preventive materials such as the old botanic gardens are modern biologic rem and produce anesthesia A lar cry from the drugs which stop convulsions relieve pain akurperic chemical laboratory come sedative acetanilid and the suita drugs I rom the make such drugs as aspirin amidopyrine and many other substances are put together to elements and derivatives of coal tar and granings in modern chemical laboratories pas advanced far beyond these simple beOne bundred and fity years ago medacane depended principally upon the botanic garden for its cremedies. From these gardens came digitals which is full a supreme ten ety for the heart quanter which as appeared to the conference and elistomer which as appeared to the present and the properties of the present and the properties of the pr

much more to losm should the subject of the profile of the creations by which could be created and the creations by which to profile the creations by which of profile creation of the subject of the creation of the

The theater of a medical school where students see great doctors and surgeons at work.





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One bundered aftily years ago medicant good endersed efforted and propagily upon the botsen der for its remedees. From these gardens easing dignities when it superce eremedies when the superce eremediate when the superce eremediate when the superce is the beautiful and an enderse the superce when the superce we make the superce when the superce we will be supercedulated and the supercedulated and the supercedulated when the supercedulated in the supercedulated with the supercedulated supercedulated and supercedulated superced

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more money for working in fictiones than these factories. The people would be paid The United States promised to help build recater transporter to the couthern reput fics miustries and more factories would bring the common people of Latin America, More died of brutol ad bluss egan stom fait et a One of the great hopes of the contentince

are extremely poor sport the millions of Latin Americans who In his opening address, Padilla talked

tusidesi known as a strong supporter of Pan Interas I requiel Padilla and he has long been elected president of the conference. His name Mexico s Amster of Poreign Affairs was

safety of all imerica wat, when co-operation was vital to the partly the result of lessons learned from the pejq The good feeling at the conterence was succeedul miler imerican conference ever The Mexico City Conference was the most

Cermany and Japan them were fighting for their lives against to them inomoni test tent if moneon tions know what it means to struggle tor the had fought so many times. Imencan na now proud Alexaco is of her liberty for which Conference It helped them to understand minder to the delegates at the Mexico City The story of Chapultepec served as a re-

on Problems of War and Peace it is called the Inter American Conference

or as the Mexico City Centerence O tecally con transper The preting is nearly spaken THE ITEMS COMISTON OF STREET AND STREET the palace was used as a meeting place than ever brom believely at to March in 1945, Chapulteper became more fam-

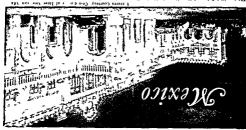
third 'tries troops under General South century ago, Chapultepec was taken by the spaniates under Cortes Just about a perors in 1519 the height was stormed by the pals a favorite resort of the later em till as a fortrees and a bulwark Later, it querors, the early laters chose Grasshipper tong before the coming of the 'pamin con Cuapulitate has had a stormy history

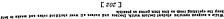
ads enturers apoleon III of France and other dreamy who was cent to Mexico as emperor by residence of Maximilian, the Austrian prince eighteenth century At one time it was the The rambing old eastle was begun in the

(1.opocatepett) and Ixtle" ([viacihuatl) in tmenea, affectionately called ode<sub>d</sub> the of the most tanous mountains cathedral Far beyond rise the snowy sum teaches to the central plaza with its great neas and beautiful buildings. This avenue a wide avenue lined with statues, flower gar capital from the portice you can look down palace has a magniticent view of the Mexican rxieca called Grasshopper Hill The famous City stands on a high bluff which the 'HE palace of Chapuffepec in Mevico

Author of Latin Imerica its Place in Portá Life by Samuel Guy Inman

The beautiful Palace of Chapulitypee in Mexico City was the meeting place of the Inter American Conference t ecures Courtesy Co-o dn rol Inter ine can int







Forms Stevenson who called him the nower dualities of the good physician than Robert No writer has better understood the hne opportunity to help mankind

in the way of satisfaction and in the way of a career in medicine will yield great returns wants to be a specialist. In spite of all this, must put in a good many more years it re to a state heensing examination And an internship and he must submit himself After the student graduates he must serve coo E¢ nedi atom &

some schools the cost per student per Jear average of fees paid by students is \$255 in A 2502 bet lest bet singent aperess me maintaining medical schools is approximate bays into the school The average cost of school spends more on the student than he s lest to 2200 s lest Every good medical sees in medical schools vary from around 550 ance interest on funds and recreation The ments and medical journals, travel meur sees board and room, medical books instru to \$1,500 This includes the tuttion and the dents for a year may be anywhere from \$900 much that the total average expense to stu The cost of a medical education varies to

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sociation and they will send you a list of the and Hosbitals of the American Medical As legges or to the Council on Medical Education the Association of American Medical Col thoose a medical school I ou can write to

sib For make a wise decision bisence it ion will talk to them they can use that ht or disquality a student for actual medical students can recognize certain quali had many years of experience in teaching and public health workers. Men who have tal superintendents social service workers cst merapy technicians anesthetists hospi tory technicians, Lisy technicians physiopportunities for careers as medical labora for association with medical work. There are medical license but which give opportunity that do not demand a medical diploma or a the reducal field There are several careers not appeal to you as much as work related to rethaps the actual practice of medicine may have any real aptitude for medical science cation you should know whether or not you Before deciding to take up a medical edu

icine acquires year by year date with all of the new knowledge that med of qu earlasmad gand of-regard to alevial year some of them at three to five Jear in frequent intervals-some of them every

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son was so short that many instrumentalists recently the usual symphony orchestra sea today than it did only a short time ago Unit will find that it will give you a better fiving byond occuestiss It this is four Rost for to become a n ember of one of the great s) m One dream of the Joung metrumentalist is terpret at to the audience

music which he is to perform in order to in and develop a deep understanding of the unally arrives He must practice tirelessiy training will be ahead of him before that day or other matrument player A long period of to the day when he will be a concert violinist ropu /fant a young musician looks forward an instrument such as a flute clarinet of e celq oder moersed is a person who plays

tuen ) on deserve the rety best training busdospities which a great singer must possess pecome a great singer and it you have the There is one general rule 11 you wish to

here in sorth smerica some of the greatest teachers of voice are at some time in your training, but right now that it is an advantage to be able to go autoad where they were written? There is no doubt of the songs better than in the countries and where could you absorb the background English than the country in which it is spoken, place could you find in which to learn a lan are written in those languages What better many songs and of so much operatic music Octimen and Italian Decause the words of so well as the opera singer must learn trench,

ers at home of abroad. The cr ncert singer as study in music scho le cr with private teach pense is usually very great whether vou through a long period of training The ex the concert stage tou would have to go netore you could sing in the opera or on

enificent Youce a successful opera singer must have a mag and success. In addition to all of these assets often spells the difference between failure pleasing personality & singer's personality to charm an audience a singer must have a may interrupt or even end a singer s career signt intolat trouble of other physical liness tou and need a strong health, body for a ca long operas—in at least jour langueses music words and action to literally dozens your gost you will have to learn by heart the an unusually good memory it the opera is in opera singer for instance must have

During the war, manufacturers of musical instruments turned to the manufacture of precision war products. The new shalls and broader vision which they developed will under result in butter and cheaper invasical unitely result in butter and cheaper invasical

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PUONED DESCRIE everything musical than the world has ever tot takten tateata a greater market tot testined to appreciate music through ratio music, There are other millions who nave come good musicians and who are buying schools and colleges who are learning to bebefore There are millions of children in our nigher incomes in thierica loday than ever more tuty employed musicians receiving this county, the fact remains that there are onely must the opportunities for musicians in -uas aven attom binos ant bne otber tent this there are some people who believe the old kind of plano and sheet music store presuces in a community too small to support wide awake music dealer can have a thriving popular kinds of musical merchandise, a certers and similar products that these radios, recording machines, television re the music store is the natural place to sell

Vivie celling is a field with ever growing the provision of the music dealer soon bags in a products and retried through radio and more chandrase related to radio, recording and references.

regimes for all types than can be produced elsewhere in the world. Plactes and bamboo in making the moodwinds and stringed instruments as soon as Insertant the moodwinds and



Metropolitan Opera etara Saivatore Baccaloni and Erio Pinas in Rossini s' Barber et Seville. Courteey Metropol tan Opera

MUSIC AS A CAREER



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phony orthestas of the United States field the Contest and and eighth the former Three bundred and eighth the former bundred and eighth the former and eighth the former and eighth and the same and the first phone or the phone of the physics are women and zio of the physics are worth and zio of the physics of

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same afternoons all of them drew large au tour of these orchestras were I laving on the certs on Sunday afternoons Even the ugh an rasdetoup—gave regular subscription con torre the Colonne the Lamoureux and the known crehestras in Paris-the Conserva imerican soldiers and officers bour well reinded Opera Comque—became the opera houses-the Opera and the of course removed after liberation Both of neen in & mbath, with the Germans were working order. The few persons who had tion and the regular organizations were in good shape at the time of Frances libera well worth while The theaters were all in difficulties but the result of their efforts was Lieuch music Josets wor ed under great

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members have been in the armed services Tutee hundred and eight five former suproismu £1\$ i (oldus spirsayoro usarybis their annual meeting in Alay Altogether the phony orchestras of the United States held 12,50

MUSICAL EVENTS

The financial report of these orchestras and 210 of the players are nomen

cent of the cost of operating the orchestras lege of putting them on the radio pay 69 per sors and broadcasters who pay for the privi the orchestral concerts and the radio spon omed surplus of \$27 552 People who attend smounting to \$1 758 502 3 teld ng a com philanthropists and triends of the orchestras \$1 130 620 Myrcp was offset by gifts from \$2 228 289 This left a combined defict of 23 827 639 The operating expenses were orchestras had a combined gross recome of are very important in paying these c sis The cuestras meet their expenses trits of money mish inferest you because it shows no or

were Robert Merrill baritone of Brooklyn Metropolitan Opera Presents The winners in 1945 the auditions were renamed the 1501HOO OIDEA TENUUE SIL 10 TINSOA E SE YAO T Metropolitan Opera Association in New rour young singers won awards from the CEUT O1 THE COST IS TRISED BY BITES a little more than two-thirds, and 31 per

in the same boat as the rest of his fellow

Linns. by the war, Sibelius said that he was merely

Kussia grad Philharmonic has traveled throughout War Relief Since August 1941 the Lemin hiladelphia Orchesua through the Russian hitharmonic Orchestra by members of the SOR THE BILL WAS MADE TO THE LEMINBEAD trumpet mouthpreces and other things of that year was a shipment of strings reeds bows Ruts sent to Europe by Americans during the pay musical equipment and so among the Europeans found it almost impossible to

the conductor of the Detroit 55 mphony rector of the Lansas City Symphony tional network, hart hrueger tormerly di sponsored a series of broadcasts over a na the pack on its lest /Ir Rescripted also denerously neiped the Detroit Symphony to Reichhold an industrial che nist of Detroit reeding the late Albert Stoessel Henry H new director of the Horcester Festival suc 2) mbpony Orchestra, halter Howe was the setts) annual Fall Festival and the Detroit among them were the Norcester (Massachu casualites came to hie again Prominent In the United States a number of war

The managers of eighteen major sym

(11 radma to Z.) TAOU WORE bns ATRIBON many hit musical scores including 50.00 Acen, composer of OL' MAN RIVER and of TERIN RESTICANA (August 2) and Jerome serto Mascagni, Malian composer of CAMP (Greed in Paris, day and month not known) 20), Colas Tcherepain, Russian compoet ing 1945 are brno Rapee, music director of the Radio City Music Hall, New York (June rour well known musicians who died dur with her husband, Henry Johansen

occupation Mine Flagstad Inved in Norwal Montana, if not to sing During the German States to see her daughter, who lives in that she would come back to the United banding in 1941 Alme Flagstad announced York a Metropolitan until she returned to had been one of the leading stars at 'ew Austen Flagstad, the Aora egian soprano would sing about 200 different songs

tust in a single season on this program ne star, Lawrence Tibbett Tibbett estimated in January, 1945 by the opera and concert regular featured soloist, and was succeeded rarade ' program, on which he had been the but songs, left the Saturday night ' ful Frank Smatra, the well known singer of INE SUO FUE SMOODINEL

audience could hear the music for the shout he asked, if, during Beethoven's Minth Symphony, neither the conductor nor the shrieking and swooning, and mass nysters mon practice of encouraging screaming Shaw was particularly scornful of the "com

in the wartime appetite for popular music Shaw ' have found a market for mediocrity A lot of incompetent bandleaders," said war Many new songs were very poot stuff, 1945 as it had been at the beginning of the clared that ' hot ' music was not so good in Artie Shaw, the popular bandleader, de-

#### TO LISTER QUIET, PLEASE! VELIE SHAW WARTS YOUNG PEOPLE

LISUP BISTE WAS The conductor Plotots Symboony of the Au' program with the ABC Symboury on the General and appeared on September 23 as solusis (Mrs. Robert Mershopt), of Cleveland Heights Ohio Each was awarded \$1,000, and the other was 23 year old Eunice Podist Laula Lechner, dramatic soprano, who 24 1945 IN New York One was 21 Jear old runners in the 1945 sucritons of the Na I'wo toung artists, both from Ohio, were

still playing to especify as 1945 chied to the Martin Beck Theater, where it was hit shows ON THE TOWN WAS later moved York It soon became one of New York's produced at the Adelphi Theater in New EVECT TREE with music by Bernstein was cal comedy-On the 10%h-based on out" houses On December 28, 1944, a must-Dios., or be (aid it sten w sellort araqu man dured by the Ballet Theatre at the Metropol played in New York during the preceding season, and his ballet FANCY FREE, was probest orchestral nork by an American to be DATA DIS TERRITARIES HADOUR WAS VOICE INC use peen adding to his successes Late in narmonic 55 mphony (November 14, 1943), A alter as conductor of the New York Philtwenty hive when he substituted for Bruno to age ait is amet nabbus bayains of w Leonard Bernstein, the Joung musician

firen \$200 scroigraphs tenor, of Sault Ste Marie, Ontario, and Pierette Marie, soprano, of Montreal, were lowing season Joseph Victor Laderoute, check for \$1 000 and a contract for the tol tenor, of hansas (ity Each was given a New York and Thomas Tibbett Itayward,

Melchlor and a guardsman in Copenhagen Deamark. The tenor sang for King Christian y birthday



Senting Sand becomes a major tructory on the Country of the Countr

seling had become a major industry of labor had come to stay and buying and to make things for each other the division civilized world More and more people began demand for things mereased all over the conid afford to buy shoes for instance The prices, Lower prices meant that more people cost for labor Lower costs meant lower much less time and at a greatly decreased the creation of many new commodicies in suces but did it very fast. This resulted in machine that furned out a single part of the shoes from start to finish a man tended a still lutther Instead of making a pair of power and animal power Labor was divided surceurty Steam took the place of man the work of many men and do it much more curues were invented in those centuries to do nmeteenth centuries As we know many ma dustrial Revolution of the eighteenth and commodities. This brought about the Indemand for goods and soon producers were As trade and commerce grew so did the

endo un to being reservoiring larges and 8.6 most offer the resistant and the state of the state

Ву Graeme О Geran

# short birow in enoital

From Explo ag he de Geography published by ligreourt Bing e & Co loc. The symbola represent the chief products which each region continuous to the world exchange of goods.



Verlage 5 ou may remember having alternal before Thanksyrang Day and seeing an espectally the large 5 ellow pumplan in a larm to sell it, and back in town your mother may

The need for trade, or exactance, is so, great list if we see an intaining lines, we would make from in and integer we around a see a seed of the protection of the propulation is needed, not to make things, but to early them ou to deal to make a work in such on the other way, as in a family to hook in some other way, as in a family to help trade

"New York, The Park B. The State of the Stat

place where it was very greatly desired tront a place where it was not wanted to a great value to a commodity by bringing it stricted That was an instance of giving blocked and transportation was greatly reath elaudgid tedt qrib oe ean it bigdu zuon tom the northern part of the stare, dollars were spent to bring in a trainload of coming to enjoy the events, thousands of point the students and the guests who were nately, in mid week a sudden warm spell melted all the snow In order not to disapweek end of winter sports, which of course ago a college made claborate plans for a are not wanted to places where they are is to transfer things from places where they We can remand ourselves how important it

## ONES MHESE MEEDED OF DESIRED

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#### MYEKE MOETD LEVDE POSSIBLE MOREY AS A MEDIUM OF EXCERNOR

would be utility impossible to the control of the c

con to confer good and services on the conference of the conferenc

sportrod to mos sometimes pay their tuition in bushels of to go to college, but had no money, would States, tarmer boys who wanted very badily 1930's in the Middle West of the United During the depression days of the early cence from the storekeeper front or sugar of eggs to a village store and in exchange restill used, as when a farmer brings a crate Today, to a very lumited extent, barter is trade was conducted in the same manner tn early times, even in this county most et knife for some matbles, you are bartering we call it paties. Heen I on exchange a poetthat would be a simple exchange of goodsother, or tor some grain grown by a third change it perhaps for a fish caught by an-One man would make a weapon, and extions, the need for exchange would spring up

things—that is to say they are either min gamminiy part are engaged in producing Of the many millions who are employed who do not need to work and a tew others of illness or old age the relatively small class bje in school people unable to work because work for wages small children young peo includes the women at home who do not istion is gainfully at work. The other half conquinum powerer spont pair of the popu World War II for example Under normal ts much greater at some times as during tully employed Of course the proportion the population over ten years of age is gain Today in the United States about half of must necessarily be higher

tore reaching the final consumer the price

brushrus cappage botatoes and orner toods the people of a community could buy the sale and retall stores were not set up where duce or for the farmer to raise it it wholeeither for the railway to carry the farm proto go a step further it would be useless

useless for the farmer to raise them regusport these commodites it would be the larmer it the radioad or truck did not where they are scarce is just as necessary as ect on where they are plentitut to the city kins or cabbage and other products from a way and help ng to take the tarmers pumpand sale of goods A man working on a rail spobs and offices concerned with the storage tepairing of working in watchouses stores transportation of goods and in building and

restly trading detween indiana and white men was by barier decense they had no form of money in common.



modity must pass through many hands be to only common sense to see that it a com goods is, the better it is for all concerned sumple the distribution and exchange of spops from this we can see that the more sale in conveniently located markets and they must also be stored and then offered for to where there is a demand for them but duced and carried by sea and land and aur when they are wanted So it is with other

docks harbors and railways used in the pe cubio) of m maring and repairing roads Think of the millions of people who must

the problem of distribution ries) to the consumer or final user, is called of Setting the pumpkin (and other commod sine to anyone in economics this problem and is on your table, that pumpkin is of little vever until it has been made into a pie n, and she has the money to pay for it very badly to have just such a pumpThe banker believ but sets and ellers he is a real part in product on The langer who me receives a dispute to the try by preset he regolation or by continuous ing a lawsu t is equally independable in the present actic of scorety. The action or surger or surger may also cleam to belp in production be real and action to belp in production be

when the proposed may be a particle, on a short a particle of the particle of

It is equally time that it shoot leachers did not elected in the holosels expended not elected to our teeth if wholesels expect not conveniently located properties were not conveniently located properties the properties of the p

conference in from the field of the field of

## VIZO PRODUCTION"

The Thomas of British of States and I not successful to the States of States

rutough to our town Perhaps it was de Show that the failroad can t get coal trains ate them Besides there has been so much rage because he can not get men to oper truce of his six coal trucks are in the ga ter or a ton as soon as he can He said that Jay se tu 193 liw Jud won Jdgit zu 101 genun agent togal and he said he can not do a ne re going to do I called the coal dealer ast tor two more days. I don t know what Mother ne have just about enough coal to Ment saying something ike this basement after fixing the furnace for the your tather may have come up from the more and more men out of peacetime jobst ada and also that the war needs were taking many parts of the United States and Can 1944 45 there was a great deal of snow in on remember that during the winter of whole but even in your very own town Loa tion process not only in the country as a man is a very important link in the produc drive home to you the fact that the middle bluods nortengulli land garwolfol sdT

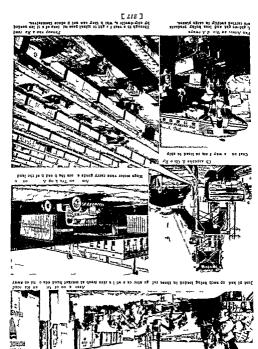
#### THE TOME DWELLERS DEPENDENCE ON THE MIDDLE MAN

distribution of commodities

die men and so belp us to obtain a better ganization might reduce the number of mid to prove it is true however, that better or ices rendered While that would be difficult say are entirely disproportional to the serv product into our hands These charges some cover the costs of getting the completed dollar ne spend goes to the middle man to the average fity nine cents out of every times the cost of broducing it Actually on goes into your automobile tank sells at three samer for \$8 and the gallon of gasoline that cosmus 24 to buoquee man pe sold to hom grocery store for five cents The pair of shoes tor one cent is sold across the counter of the piann because the bunch of carrots he sold may for example hear a farmer triend com consumers shend goes to the distributor 2 on

A consequency to base of each Applie There of the Consequence of the C

cause he amuses and cheers the life of his fellow men and helps them to work to better



TO MARKET BY LAUD WATER AND AIR

The United States produces more out than it can use, while Canada is the chief producer of nuckel, which the United States needs The latter can send oranges, lemons and

On the other hand, though the United States makes more motor care than all the states more motor care than all the states of world, it at an its constitution of the states of the state

#### VED OL TIAING DELENDS LHE INDOELS ON ARICH OUR SLYND-

self some of these goods to huggly turing more wheat and cattle than they can eat and Both Canada and the United States raise United States and Europe which need them and can spare wood pulp and paper to the Canada, for instance, has immense torests modity than it can profitably use at home may produce much more of a particular com come independent of its neighbors A nation an or sanddas ugnous conpord Amassacons Under the modern way of life no nation can that have been produced in foreign lands every province of the Dominion use goods the people in every state of the Union and part of Canada produces something that the people in foreign countries want. Libewise Every part of the United States and every

## EXPORTS FROM CANADA

things it imports from outside its borders exports a country is able to pay for the many pijes and typewriters. By profits from its many manufactured goods, such as automo raised by her farmers. This was also true for more than 30 per cent of the toodstuns the office supplies produced and slightly ber cent of the tobacco crop, 25 per cent of exported about 30 per cent of her cotton, 35 tnes need Belote the war the United States commodities that the people of foreign coun ednelly true that we produce a great many we need must come from foreign lands, it is shinut Augus jeut anat it si Aruo toni juri can hve by itself Foreign trade is impor sons taught by the war is that no county One of the many temble and costly leson paper made in Canadal

ed States to , Buy American , were printed new-paper articles urging people in the Unit to our annual control of the control

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#### LYBIES COME LEON LYE TYMDS SOME LOODS ON OLE BEEVELYSI

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## tant to your realth and comfort the products of others

cuted to ctose some rooms on to save near, and you may have slept on the softs in the hung room You can readily resize, that the went through such an experience, that the middle man, the dealer is very, very imporAcadementary noted to would competent for the mean of the mean of

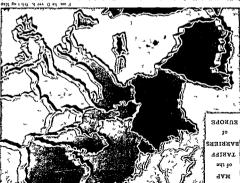
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Various countries tried to relieve the dethe worst depression of modern times swept economists fett as why in the early 1930 s If they madic were built anound each Oom I fully made and builting off all ommunication with they madic rations the level of control to the state for the following the full off at the funding of the fundered compare to the full off attiff wall is a government tax on spoof compare into a constitution to the full off attiff wall is a government tax on good compare full off a full wall is a foot off the tractory.

which for the member of Mic a small be and offens waits of the people are few a ground or poble can hive almost without members of the buffer groups but their state of carliaration and in or be by members of the presence or another present and the buffer of things default of the state of the present of the pretable the cupits of the present of the pretained present of the present of the preparation of the present of the preparation of the present of the preparation of the pretain of the preta

graphistic to Canada Some of the furs which Canada does not need with the state of than pay for them. All over the crulized world the supplied change necessary articles are received. No nation can live and prosper without using the products of others.

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Conference held at Bretton Woods New sur representatives to a viorid Economic th the summer of 1944 torty tour nations

torced to emigrate or starve beobje upo now five there They would be bresent but not enough to support half the quantity of food could be raised than at suggested in the total suggested a greater with manufactured articles Probably it an one prie tood with cost from its mines or it produces nardly a trind of the food it eats series sit to uotistuded sars a firm Vita Vitanos De much worse orest britain is a small bluow enothboo abent bne garrutselunem

A pere a county depends chiefly upon USON to ano unotes an other aidood to bije nb racrotics world close and millions pe much discomfort Surplus goods would acopung such a way of life, but there would the Soviet Union could survive longest after country like Canada of the United States or alone cut off from its neighbors. A large again tollow the stily notion that it can stand

it is to be hoped that no nation will ever ant of such a wrong posicy great suffering that resulted from the pur We all know the terring loss of the and the bring at the expense of the rest of the world servitude Thus Germany would be sell suf nations reduced to a state of agricultural atacturing center of Europe with the other Germany become the great prosperous man trees of Europe Hiller's plan was to have



TOOLS TO passing year sees an increase in the division nbou escu other Kemember also that every or rabor the more dependent men become remember this the greater the division trade and fnance

great step in co-operation in international a resst is at it beigobs at it it and about been made Time must test the Bretton ments of the forty four nations A start has bassed upon and approved by the govern

Before it can become effective it must be perous, the world as a whole would benefit the belief that if they could be made pros m choiled bis wasted to beckward national neip nations temporarily in need stoney the pool would be loaned on good security of coursion bool 1/1 ben necessary money mon by the nations I be money would go that oe created through contributions of mone) national Stabilization Fund This limit sould The other device proposed was an inter

#### TO RECOME PROSPEROUS V PLAN FOR HELPING ALL MATIONS

nous scattered all over the earth problems of trade and commerce among us ruis or contse wonjq Eresuly sumpiriy me connected with international trade must bu through which all financial arrangements devices The first was an International Bank As finally adopted the plan called for two

too extreme to be accepted entirely new name he adopted The idea was sened and an international standard with an the dollar and the pound sterling) be abol monetary standards in each country (such as many ideas were proposed One was that the netore the definite plan was drawn up Cooperation

the Bretton II oods Plan for II orld Economic conference drew up a plan it is known as trade and commerce the delegates to this save world prosperity is by co-operation in nenertul that the only possible way to co obstătion

bolicy isolationism. The opposite policy is and economic self sufficiency We call this do everything possible to promote political would be to stay away from each other and inst seen that the only way to have peace the great nations seemed to think as we have some unfortunate things happened Many of y on know from your history that after 1915 coming of peace that followed 1/ orld 1/ at 1 want to see the same mistakes made with the Japan and leaders in many nations did not been made in the war against Germany and Hampshire By that time much progress had

100

We speak of the East, but where s 11? In one east of where you are standing at the mo ment We who have in the eastern part of

Dur tow work darsz have almost detroyed the Durst of the Christ between the time, and the British and Bussins light ther diplomatic batter in so dip balaces to the opportunities that the Sphinx views with moderntaced industry Egypt still possesses the present of the presence of the moderntaced industry the moderntaced industry the processing out young to the presence of the limit of the business of the limit of the business of the limit of the limit of the limit of the limit of limi

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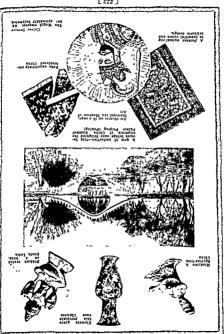
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SOME TREASURES OF THE ORIENT

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Now two great wasts have systed in the objects thes around the woold swithing de structively through one Oriental country after another, earlying soldiers in British and American undorras into fands which were once known to them only in fauly tales

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take us from the old European centers unto
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and brench and Kuss and Poles sprang to quect them yew cities peopled by British of the West, with engineers and contractors drilled and trained laborers had to come out to be laid and modern on went had to be tes great treasure of oil So modern rails had nb ph the passions and greed of mankind is beyond But the chief reason it was stirred from the Mediterranean to Russia which lay increan supplies had to be carried across it Persia was drawn into the war because

tomantic to us as ever their ways would seem as my sterious and as people tive as they tived centuries ago and valleys of India and among her mighty h its ice conid be repeated today. In the deep knowing it served in the British Secret Serve as begging boy for a Holy Man and without united States het the story of Kim the graduates of Oxford and have traveled in the Alany of her maharalahs are sammed universities are scattered among her princi swellers and ner power plants achools and her great factories and foundries her appearance of modern civilization She has times the senting now an outward tery and romance that it possessed in earlier Yet the Orient still keeps some of the mys

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Chinese scholar is murmuring lines from La are unable to explain and somewhere a still periorm tricks that even our wisest men comenhere in Eastern lands magnerans

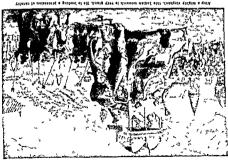
ing of the freedom of man 5 soul Anada at I wod Banggad and days aibal to nais boet is felling a tale in song and the truth

And somewhere at the same time a lersian swour pue

torn there is God a face werely God comprehens CLOCK IS the east and the west and wherever ye bass He reads from the horan

seems jitte cpanged by the centures as they or rides his wonderful Arabian steeds and tres his nomadic life and drives his camers with a passionate loyalty So the Arab still skin let the Arabs love their native land peats so I excely and the blown cand cuts the vite the tourist to settle down where the suit or not soon it bug 11989D 188V & 21 gloca for who might have stepped out of story books stees and villages and princes and peasants pidden recesses of Persia one may find pal nb spont speae sugarties yet still in the

and stories of strange perilous adventure







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"These of commerce and myster—dressment of the Porton root in rands of the great gift so if the Order to only to the Carlo and t

to are in anoth from the truth 1 or dreams survive in the midst of sortow Sulfeting can not full them As in contuines long gone by they still bring their gentle comfort to the homeless of the earth It iped seem to don trakije and easily lost

the old people to the grandchildren Orient so the tales are passed along from telling is because there are tener books in the tive happily torever after Perhaps this story comes to free them and marry them and until a nandsome prince or even a poor porter Beauty suffer under some mag crans spell ponerful jun umprisoned in bottles and tolk tell fairy tales to one another about CHOAD dreaming and more story telling hurry as fast as we do They do more day The men and women of the Unent do not seem to cling to the ways of childhood longer land and a simpler life than ours so they more foudly and publicly. Theirs is a simpler and more readily and in some countries weep in Eaker colors than we and they dance and The men and women of the Orient dress der outer China, crost the Bay

when we have some and the some party and the specific party and the some party and the so

And the clouds grains about 1 he board a bread but there you will find the plank highway of Chin Camposed in fregrant lolisage. And the spread of water of springular Frowing around the city wall of Shult.

anderson for untentions and developments in electrical engineering to Dr E F II Alex neers Eduson Medal the highest anard in American Institute of Electrical Engi

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lecular films and inventor of non redecting Astharine Burr Blodgett researcher in n o It omen \$2 200 Ach evement Award to Dr Sur casify to nonproperty ирэнэтү

Asarship sculptor tenne Gold medal of the Institute to Faul good diction on the stage to Eva Le Gal author and playseight \$1 000 poetry prize to Wystan Hugh tuden poetry prize ters Howells Aledal to Booth Tarkington tal bar etil to stutitent fonotio of sat buo

Imerican Academy of Arts and Letters COLVE ALV ILAY Best supporting actress—Ethel Barrymore Best direction—Leo McCarey for d recting Best supporting actor—Barr, Fitzgerald ture—Coine /IY // AY Best actor—Bing Crosby Bergman Sciences for work done in 1944 I'est pic Academy of Motion Picture 1sts and

tier a ten of the ones given in 1945 given for outstanding work there we

CASS TIMERRIANE by Sincle F LEWIS Ullman THE WHITE TOWER by James Ramsey RICKEHAW BOY by Lau Shaw

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STORE OF THE SECRET STATE by Jan Book of the Month Club Selections

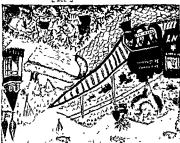
ley Medal to Dr Sanford A Moss for his let propulsion and other scientific work Hol neers Aedal To Dr Will am F Durand tor instructa Society of Mechanical Engin KABEIT HILL

bery Medal to Robert Lawson author of of Rachel Field 5 PRALER FOR A CHILD New Interiora Library Issociation Caldecoil

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KYCE, INVA VAD VIRE DIEK PÅ HEJED MECESSARY MELLIE BY Charlotte Baker Crane иск чир ичи и кисктен ру Адап

THE ANTIQUE CAT by BIRRICA Bradbury

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regres Rannon

by Earl and Linette Burton THE EXCITING ABVENTURES OF WALDO THE GROCERY MOUSE by Eleanor Clymer ITENKY PA FEE PIDSWAU

Henry THE LITTLE FELLOW by Marguerite Kay Stafford and Louise Zibold LING ТАИG AND THE LUCKY CRICKET by d'Aulanre Wives ron Per by Ingn and Edgar Parm THIS IS THE WORLD by Josephine Pease

GRECORIO AND THE WHITE LLAMA by Primary Grouplunior Literary Guild Selections fellowships valued at \$2,500 each Guggenherm Memorial Foundation gave 96

Guggenheim Fellowships The John Simon her story Wonderful YEAR Pord, Julia Elisuorth, Foundation for Children's Lateralure To Nancy Barnes for understanding among all peoples" tor the 'promotion of good will and better

Churchman Auard To Henry A Wallace, LOVELY IS THE LEE by Robert Gibbins REVER KED DA Lefet BOMEBU

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THE YOUNG CORSICANS by Anna B Intermediate GroupAutomal Association for the Audouncement of Colored Feedy and Colored People in The Spingars metal for the fight of Colored Feedy and Colored Colored

THE AMERICAN HOY S OMNIBUS by SLAN Flore And Lav Allers (Aroner, Raider) by dimistong that a fare that the flore order

Active of Duth of Parties by Red Sacket.

Augustes Africa by Referio Buson Med

Active s Africa by Referio Buson Med

Hurriche Treasure by Bert Sacket.

Older Boys Group—
The Aviation Dictionary for Bols and Graze ed fed by Lesl e E. /enile
Corners of fed by Lesl e E. /enile
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SCATILER OF THE SOON PEAKS BY Harold SEATILE OF THE SOON PEAKS BY Harold STATES IN WITHOUT A SURMER BY Ethel PATON A SURMER BY ETHEL STATES AND SOON OF THE SOON PEAKS BY Hallette

PREATER BLAND WORLD VENCORD DY TREATER BLAND WORLD BY TREATER BY Cladys Malberne B HEAVE A VESSE BY Elleworth Vencomb

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THE GULT STREAM by Ruth Brindze
THE ESALIO HLUTER by Tourse Hayes
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The Very Good Asichbors by Itmen
The Cult Stream by Ruth Brander
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The Kenifemen in the baseball and is Rive Cloody knitonided by some of the konne slukers who bein morts COUNG ML MAY tech dobulet. Leo Presedent of Kollon Hicimia Plice and Sciances edged it the Lexu a best modific



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Walter Florey, Oxford, England Boris Chain Oxford England, Sir Howard Dr Ernst Alexander Fleming London Medicine-Sir Physiology and St61 Versey. Switzerland and Princeton, New norm2

Physics-Prof Wolfgang Pault of S+61 o c Peace-Cordell Hull, Washington, Stái

Chile Literature-Cabriela Mistral, of Stor

of Helsinki Finland 1945 Chemistry-Prof Artluri Virtanen the Red Cross Geneva Surtzerland

1944 Peace-International Committee of Berlin now in the United States Chemistry-Prof. Otto Hahn, of 1944 were made in 1945

yopet buses gome of the 1944 awards Gray & Sandy book for older children, Elizabeth Janet

STREAM, illustrated by Helene Carter Best for children under 12 Ruth Brindze s Gurr mariated by Russian children Best book Cohn a Little Prople in A Big Country, children a books. Best picture book, Norma

Donion George 5 Schreyer Zuleime 1500 Photography—Dick Lindgren Thomas Ranks Ensemble composition Perry Thew Musical Composition-1 iano solo Dick 3 H Stearns

W Jerome Marquis Short story Jose your Terms Literature-Essay

ramics Mildred Stockowski Lillian Bajer Prints Leona McNeley, Raymond Johnson Sculpture, Aldo Pitassi, Frank Suleri, Ce Rench Priscula Mulching John Clague Arnold Abramson Ink Gilbert Tucker Gil bert Zabarkus Vasso Ameredes Earl Agrima Helen Singer Crayon Margaret Stucki Abramson Water color Morris Silverman Lies er Richard SHO--HA Arnold States and Canada Among the winners are and senior high school students in the United TIME shousous a contest open to an junior Scholastic luards Schousstic Moch Drama-HARVEY by Mary Coyle Chase

SPRING a ballet by Aaron Copland Musical composition-APPALACHIAN MIN REBET DY RUSSELL Blame Mye Biography-Crosce BANCROFT BRAH harl Shapiro.

Poetry-V Letter and Other Poems by byen gonzal

portent it is to love thy neignbor as thy un won panteat 197 100 Sen british for the protret pood to beople all over the world totld that II would bring a new union and Many men and women hoped victory in med ut drus

sians batting in Java Alisety and dictator turbances in Iran The British and Indone war in China Bloodshed in Palestine Dis papers or learned about it in school Civil on pare lollowed the headines in the news sasy peace unioriumiety as you know it peen at peace for only tour months. An un MOUNT METER BY THE TIME OF THIS MUTHING DEG lunior high school will very soon inherit a You who are now in grammar school and freehe who will have to solve them!

perote you for one good reason you are the mentioned-attempt to put these problems prosucasts as the School of the Air which I grams on the air-news coverage and such streen in recorded history. The serious proare narder to solve than any which have problems contronting the world today which That would be too bad because there are as pard as you could to be interested in them

Builds with school you may not be try ing beer that because they are connected in your to make them interesting to you but I sus abouting tot mese programs try very hard essis like School of the Air The people reschool you have a chance to listen to broad kind of program on the radio Perhaps at news broadcast when your parents have that now and then with one ear you hear the Ciava pue pismu Burws or sauriatuos pue I /laybe to Bob Hope and Henry Aldrich VOU listen to the radio don't you?

granted opportunity for success and nappa renseason and kind and industrious be (4) will a man who is intelligent and 10r good or evil?

creation of new benefits to humanity be used

at educative powerful possibilities for the and terrible possibilities for destruction and (1) Will atomic energy, with its awesome reat freedom of speech and religion;

guarantee political freedom freedom trom reedom from acant-as we have worked to work as hard to assure economic freedombroductive years? In other words will we brovide for themselves beyond their own and comior to educate their children to wage which will allow them to in e in security granted decent working conditions and a (2) Will workers all over the world be will stand together to preserve the freedomst that for all time to come men of all nations made to carry over into the peace and assure Alies demonstrated in Norld har it be (1) Can the union and strength which the

and the day after keep on answering them today and tomorrow tions hoping that you will answer them, and problems right now I m going to ask ques in going to present a tew of the main

CHIEGOR ROM RIGHES was a different color or his religion shightly tor no better reason than because his skin even pave seen a boy beaten by other boys and menacing words race riot! You may their employers You have heard the ugiy and management-between workers and going on in the United States between labout sell tou know about the bitter disputes

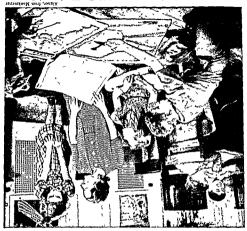
By Morman Corwin, author of On a Mole of Frumph

MANUTAN KANTAN KANT

the World Today

Questions before

To understand world problems, keep your geography up-to-date. These arth graders use plastic mapa.



and adequations and adequations and adequations and adequations of the Lour should come to this great leak that Jour should come to the large and adequate for all kinds of opinions and adequate for all kinds of opinions and the large and vision and the large and vision and the large and vision Allers and and vision ana

liexule in their thoughts and actions than colored by years of association with one kind of job and perhaps a limited group of friends and actions.

the dominate and the districts and the best and the under gradual that lide illustration and the district an

group which is in the majority? Or will the members of minority groups—for instance, in some countries, the Negro and the Jew-be judged as all men should be judged, on their ments as individuals?

come point to the right of left or above it frequency radio waves when the uses high the same in its theory of operation. Instead of sound it uses high requency radio waves when the same in the properties of th

brooks over in thous seconds brooks and a thousand and two and twe and two and two and two and twe and twe and twe and twe and

Les Drope of radar to very sensitive in the form the collection in the collection in

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HOM ME VIVA SEE





Men work with an air of tension in the radar plot room of an activities the reder is coordinated, written down and studied.



ings at log bound airpoits

To what deeds of wonder scientists will
lead radar no one can foreletl, but the ad
tances that have been made give promise of
many new developments to come

As we now command of the second command comman

is flow on poet of the next less wail be in the next lew years radar will be an merchant marine. This electronic muscle will blackness (it will warn of reclergis, other recests, reefs, sunken bulks to shortenes it will port out channel markers, lighthouses, will port out channel markers, lighthouses, buoys and docks

Officeroes configuration and the could stall of could stall of the could stall stall of the could stall s

ures, mas responsible for destroying much of the effectiveness of the Cerman radar warn ing systems RCVI operates by filling the air with false echoes to deceive "listening" radar destronce. Day in Normandy sew reds place of the State of the State

roo 232 enemy planes were shot down uesh or radar in one twenty tour hour pemen pompers might sitter might, with the Air Force nere able to turn back the Gerrively small band of brave flyers in the Royal ain, during the autumn of 1940, a compara-THE IT SEE COUNTIESS IN THE BRITIS OF BILLS The dramatic victories of radar in World biast targets at night or through thick clouds readar bombing equipment permits planes to assists pilots to land sately in had weather because identification of triendly successfund bispes perbe direct gundre neips search for teries rottable equipment carried in airngues, anti aircrait guns and big gun bat shippoard control equipment such as searchtheir courses is adar sets on both land and roid or storegiven Buidion 'southe surres span approximately one quarter of the tong range navigation (LUKAN) stations the gray of tog Complicated networks of direct agaier planes in the black of might or tange of sight or hearing intricate systems secret bigues joud peroce spek come into ringe ground stations are capable of de there are many applications of radar

the observer rection and distance determination easy for There are scales on the screen to make di-



the scenes which are called high colors in the color-time to the colors in the colors of the colors

Children are abour mentions deposits at the Eidenbes mine, Crast Beret Labe, Cranda.



and groped for ne replaneatu ii florg and groped for a replaneatu ii florg and flored for the control of the control at the control of the control of the the control of the control of the the control of the control of the at the point where the Las and the control at the point where the Las and the the ence business treed to see it out and and one of the control of the control of the ence of the control of the control of the second of the control of the control of the the control of the control o

District when called a line laboratory wild replicable and profit may be chosen but the man but of the man but the called a line letter as the man but of the called a line and the man for more than a line and the man for more than a line and the man for more and the line and the man for more and the line and the man for more and the more and the man for more and the man for more and the man for more and the more and the man for more and the more and the

Cluce to the younger students following them in 1892. Professor 1/1 linelin Annual Board Root in 1892. Professor 1/1 linelin Assarbave and corners and come substance but not through others and make stull others suddenby shane brightly.

The remember in that show the moles and in mothe about the control of the control

ON A title stable of elements on page 45 content of the title stable of the title of the title stable of t

Dicersity of Minnesota

B3 Willem I Luyten

THE STORY OF SELF SYLASHING ATOMS

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The second of these particles, the electron, of the opening of the opposite Lind so we say that the proton for his a positive charge, and the electron at negative one / proton and in electron at

10,000 000 000 000,000,000,000 100.

The proton carries a small charge of positive electricity, the smallest amount that

he year year into posong nata so are shoold at the control of the

After the discovery of radium, progress nas very fast, so many scientists began to north on radioactivity that discoveries followed each other in very quick succession The knowledge gained in fifty years has been amany.

MOST IMPORTANT PARTICLES IN THE ATOM

PROTONS ELECTRONS AND RECTRONS ARE THE s (ex ano Burpues ar minuen bure is several million times stronger than tive than uranium Kadium when it is very note of these substances are much more ac iand in second one was called radium tonium in honor of her native country, to-The first of these Marie Cure named po from the mass two new radioactive elements and again, they were hnally able to set free urede it durytring nour bas 'it git tring one breakingly difficult job of examining the ore, taken out of the ore After a long heart used then continued and rest terror the terror of Austria, a whole ton of the waste ma lucky enough to get, from the government bounds of rock to mvestigate it They nere so they knew they would need hundreds of was in the ore in very very small amounts pretty sure that what they were looking for the puchblende very carefully. They were tive than uranium 50 they wanted to study courain oiner elements even more radioac plack They suspected that this ore might Prown as pitcholende because it looks so mines at Joachimstoal in Bohemia, and was compounds. This came from the uranium much more active than other uranium num and found one piece of roch to be very large number of ores and compounds of uraTwo carnest students worked with Bec queet in Part They were Pierre Curte, a French phy sets to and his Polub wile, Jlane Sklodowska Curte These two examined a

MICHETEADE BA WYNIE YND DIEBBE CORIE

Letter, it was found that tadioactive bodtes send out still another kind of rays still more penetrating than the beta rays, after the were simply called gamma rays, after the third letter in the Cireck alphabet

to pass through both silver and pass of passes, but the first through through the first through through through through the first through the first through

say, it became 'nonzed." changed to a conductor by these rays, it let is normally a good insulator, was almost charge This must mean that the air, which electrified body, it would slowly lose its rays were passed through the air near an through which they passed, in much the same way that X rays do When the new soon that they did something to the air after being in light. As these new rays are given off in the dart, Becquerel knew that they were not X rays. He also found out very those materials that did not phosphoresce materials sent out these same rays, even the metal uself, and found that all uranium rater he tried other uranium salts and even orack paper, but also through the silver ring that had passed not only through the autos 10 ster ino inas aven ismu iles minin had been "exposed. In other words, the ura plate and found black spots on it The plate the way for several hours he developed the speet of silver in between After leaving it on top of a photographic plate, with a thin atapped it tightly in black paper and put it some of this greenish looking salt then he violet light Fust he let the light shine on brosbiotesce brilianily after being in ultra of the rare metal uranium This he knew did did not have much luck until be tried a salt was Professor Henri Becquerel, of Paris He One of the men who tried along these lines

no electrons in a nucleus 14 hat happens is spooting out of the nucleus, though there are electrons Yes, they are electrons that come

that a neutron volently splits into an elec-

tron that dashes out and a proton that stays

The gamma rays are not particles, but рейио

gier lear

in the past chemists had always found

spells of the atoms-but radioactivity comes are really dealing with the outside layers, or alpha, beta and gamma rays We know non changes the way in which they send out their ine substances is that nothing we can do the remarkable thing about these radioac combressing the gas or thinning it out but ing or it they were dealing with gases, by section by heating and slow it down by cool with each other they could speed up this rethat whenever chemical elements "reacted

all these outer layers It e shall come back

it for the nucleus is too well protected by

from the nucleus, where we can not get at

nune, this screen will begin to glow all cent material such as zinc sulphide Atter a which we have smeared a little phosphores dark room he then lay it on a screen on it in a thin sheet of paper and take it to a wrap some substance that has actinium in ezambie, we can make this experiment we that the radioactive element actinium, for ments Usually this gas is itself radioactive gas that is produced by some radioactive ere-, curanation, which we use to describe the to describe what happens. One of these is we have to use many new words and terms As we learn more about radioacurity

to this later on in the chapter

моря прэдок ing from the actinium which makes the it is not the actinium itself, but a gas artsnies and then comes back. This proves that blow at it, the glow goes away for a few min around where the actinium lies But it we

see it' and so the wire seems to have be-Ve rue min is so extremely thin we can not this thin film stays radioactive for a while metal wire, for example, it leaves a very, very thin film as a coaing on the wire, and is that when the emanation gas touches a as if it were radioactive itself What happens that gets close to such an emanation behaves Often, too, we find that almost any collect ENVEYTION BECOMES SYDIOVCLIAE ILSEIN

WIRE WHICH COMES INTO CONTACT WITH AN

COMP. FACIOACTIVE

to pile the only rays known to be sent our The beta rays are also particles. They are

alpha, beta and gamma rays That is what

the uranium atoms sooner or later begin to clet together are not strong enough, and so to peakly too peakly the torces that hold nu-An atom with 238 protons and electrons z paz

next spell, 18 in the next, then 32, 18, 12

in the shell nearest to the nucleus, 8 in the

patterns The uranium atom has a electrons

ia) ers or chells, and the shells follow certain

speed The electrons seem to be arranged in

electrons circle round the nucleus at high

stom He call the lump the nucleus The

ugany together in a lump in the center of the

electric charges, which add up to no charge

is-su coust number of positive and negative

edual number of protons and electrons that

and 92 electrons. Always an atom has an

mannum' apicu pas da brotons, 140 neutrons

which has one proton and one electron, to

make the dillerent elements, from hy drogen,

brotons, electrons and neutrons combine to

peroug to any atoms, we call them tree pro-

These, of course, are particles that do not

the parts of a single proton or electron

And we have many photographs that show

ways of making visible their effect on gases

ticles, we have been able to devise several

though there is no way of seeing such par be around a trillionth of an inch in sixe

custge Scientists guess that a proton may

together, canceling one another's electric

pe a proton and an electron locked close

ne can it a neutron A neutron seems to

no electric charge that is why of course,

virtually the same as the proton, but it has

A NEUTRON SEEMS TO BE A PROTON AND AN

out apout 1/1850 as much as the proton

same amount of charge, the electron weighs

small particles is that while they have the another What is strange among these very

repet one another, and electrons repet one tons try to get anay from each other-they

tract each other very strongly, but the pro-

ETECIFOR TOCKED CLOSELY TOCETHER

The third particle, the neutron, weighs

tons and free electrons

The arricle on Atoms, page 43, tells how

the protons and neutrons are packed

gether it is more exact to call them alpha two biotons and two neutrons locked to-The alpha rays are chunks from the atom, satioactive means ont the rays we have been speaking of-the ish apart. As a nucleus falls apart it sends

saturated

[ 922 ] They carry a double electric

note that way Let us take and ther case day's there would be nothing left. It does not this would not mean that after one hundred ruem per cent out an ailur particle con take, say, one day before one per cent of mong a particular kind of atoms it will now say (from their experiments) that minou fines a pigiou ajoure and bis sieres eren in a purpoint there are more than a could not tell what would happen to it. But series stoms it we had just one stom me a fittle money. The same is true for radio that on the average the company will make ains air faut naut den sign ut summand about 70 50 the companies calculate their they will on the average, live until they are ouce beoble have reached the age of 30 say tables the insurance companies know that any one person, but from their records and one ever knows what is going to happen to rue combany will make a lot of money of our it he lives until he is over 90 years old the company will lose a great deat of money one the day after he takes out his insurance his children when he dies wow if he should in return promises to pay say 510 000 to each year to the company and the company, satisance he pays a certain amount of money person who is 30 years old takes out life in entance company looks at people When a radioactive atoms in the same way as an in pieus wast that means we nave to look at хэ оТ Still another term is half life

we have degun to use in radioactivity 3 year and this is another of the new terms three million volts higher He writes that custRed plate to spother which is charged electron when it travels from one electrically nik of energy equal to that gained by one election tolts meaning that it has a quan

A prospector carefully examines some radioactive ore which has been dejected by using the portable Geiger machine that he is carrying strapped to his side wit ones a run stored protog app



pers brencie pre su energy or course uninou tone and so the physicist sale that such a dulerence in voltage, such as three million celly charged plates that have a very great electron which moves between two electri mey behave in exactly the same way as an esbecially with the beta particles to say that amount of heat they would produce, but, and it easier, though, not to express the mio neat and he can measure into neat the paumi et Aliana sun naddois are fan uau e beur-ire a builet trateing through an Zurag (Lious russardar s fer assur 10 liv

THE MEM LERMS ME ARE BEGINNING TO USE CHORY SHY ZATT STYR GRY LICA KONLORTS

or read

eight inches thich, or even through one meh tuck can get clear incough a piece of mon citating than the alpha and beta particles magnets that they are very much more pen can not make them curve around between but behave like mersible rays of hight ne

tenth of an men thick and even through a sheet of aluminum a they can go through sheets of paper easily, sie much more penetrating as ne can it ugue they can also go much iacther They unies bet second that is almost the speed of come of them have peeds up to 180 000 ruck reaset much taster than alpha particles es The beta rays are very much lighter and mics per second, can travel nearly 41/2 inch the tastest with speeds of about 15 000 rice get stopped after one meh of air but they get stopped-the slowest alpha parts they go the latther they can travel before men or so of air will stop them The laster very high speed and they usually do not get these very tiny particles this is not really a of 10 000 miles per second or more Among tound out that the alpha rays travel at speeds tigret in a curve by this means we have longer move straight but begin to turn and bigges cogiged with high voltage they no tween two powerful magnets or between two charged so when we make them pass be sug pers barricles. They are electrically He can measure the speeds of the alpha

gire need by each there is a difference in the amount of exploput some spoot much taster than others and guns, each shooting only one type of bullet, that there are only three kinds of radioactive terence in the way they do it We might say gamma rays, there is still a good deal of dif by radioactive materials are alpha beta and of that metal. An asotope is almost the same trically at all However, it has changed in neight down to 234, and what we have is a new form of uranium, known as an 'isotope new form of uranium, known as an 'isotope charge each, the atom has not changed elecsud two bets particles with one negative one alpha particle with two positive charges, uranium II But now, after first baying lost more than one munute and changing into much faster, living a half life of only a little meanium % does the same thing again, but neeks, and changing into uranium X., Now as thorsum This breaks up again by shooting off a beta particle, living a half life of three weight 234, but chemically nearly the same it then becomes uranium-Y, of atomic half hie of uranium is several button ) ears off an alpha particle, rather slowly, for the 146 neutrons and 92 electrons Tust it shoots of total weight 238, containing 92 protods, It begins with ordinary uranium, an atom

# ONE OF THE RADIOACTIVE SERIES STARTS WITH ORDINARY URANIUM METAL

at it a little more carefully

Mais a minote

on the mean of the second of Methers, of Person of Methers, of the second of Methers of the second o

In that the property of the property of the property of the provided by the property of the pr

cheesper metals. We still can not make gold out of cheesper metals a flast is, we might obesibly change a few atoms of one element mto gold, but to make a pound of gold from minimum and manager elements by transmutation would take us thousands it not millions of years of elements What they really wanted to do The technical name for it is ' transmulation rog of one chemical element into another Ages, it was known as alchemy, the chang element. This is the dream of the Middle in other nords it becomes a NEW chemical and changes its chemical properties as well, an alpha particle it toses in atomic weight that when a radioactive element shoots off somewhat similarly to thorium So we see cyemical properties and make it behave from its outer shell This will change its It does this by getting rid of two electrons charges, that is, it must lose two electrons the nucleus, so it must also lose two negative brotons that is, two positive charges less in 33g pelote now weighs only 234 It has two alpha particle, is that the atom that weighed nium nucleus, for example shoots off an the explosion what happens when the ura tes, and the atom must balance itself after change the electrical balance of the stomi' protons and a neutrons? Doesn't that an alpha particle-that is, a combination of that happens when the nucleus shoots out onizide as it has protons inside the nucleus same number of electrons moving on the We said that each atom always has the

in the Middle Ages was to make gold out of

For different indoparties, offenerate ingle being the second control of the second in a second to a control of the second for another long the second for another long of the second of the second control of the second co

#### MUN ABYRS TO PRACTIONS OF A SECOND MALE LIFE MAY VARY IN DIFFERENT ATOMS

Its of that I had on the three and three and the three and the three and the three and the three and three a

ore was formed idea how long ago that particular piece of answers agree, then we have a pretty good have made the thorrum lead, and if these two um lead, and how long for the thornum to men and because to have produced the urani now long it would have taken for the ura the intermediate products we can calculate apart Next, if we know the half life of all unit we can tell these two kinds of lead uranium lead and if we examine it very crite -some of it must be thorium lead and somehe always find a small amount of lead in it and which contains a great deal of uranium ite, which comes from the island of Ceylon nemont so done one need on h most soc lead weighs 207, and thornum lead weighs Uranium radium lead weighs 200 actinium ically they do not have the same weight read and behave exactly the same way chem and this is the interesting and important part schacky speaking, this lead is dead butwith lead, and again they stop there-radio

A VERY GOOD ESTIMATE ON THE ACE OF THE

ests ago that the earth was born about two bullon sporter than this, and we may theretore say earth was a gas or a liquid was very much maye s reil good guess that the time the now is about 1,850,000,000 years We can or do aven aw tawens tead and mines and tells us how old the rocks are in the crust of I he answer that we were getting above then with the pragrum from which it was made any more-the uranium lead had to stal ricies conju not get away from each other once it became a solid piece of rock the par everything could move around and mix but So long as the earth was still a gas or a liquid eva and still later this lava froze into rocks they cooled off and became liquid, much like existed in the torm of gases, then gradually ning the earth was so hot that its materials was born but we do know that in the begin the do not bet know exactly now the carri

Sunce redume as the best, howen of all me diocactive elements is the best, howen of all me about 1—where it is bound, what is looked between the mean are all the substitution of the colour manipum one manipum is always extracted between by the Curus an Ibrain and the colour and the colour and all and the colour between the colour and all and all and all and formation one manipum in a colour and all and formation of the colour and all and all and in the United States there are some ores in in the United States there are some ores in the colour and the colour and the colour and all and

> D651 10 an atomic weight 210, and again an isotope ticies and changes into radium D, now t tth mimonth of a second it sends out alpha par of them all, for after a brief life of only one radium C' This is the champion performer with a half life of twenty minutes becomes it changes into radium C, which repeats, and after a half life of a little under half an hour much so, by shooting off beta particles and But even this atom is still radioactive very beal to aquiosi ne ai it beat to tant se sines 214 The chemical behavior is somewhat the particles and the atomic weight is down to tinn B By this time ne have lost six alpha is pair Lone in three minutes becoming rawhich again shoots on an alpha particle and alpha particle, it changes into radium A days, alter which, by sending out another radon is very active, its half life is only four 222, and chemically similar to neon But nation, a very neavy gas of atomic weight ) ears it changes into radon, or radium ema amount of radium is half used up in 1 600 and sends out an aigna particle Any given magnesium Kadium continues the activity a weight of 226, Chemically it is similar to samous radioactive element of all it has particle and changes into radium, the most 22,000 years, ionium sends out another alpha meanium V. and thornum With a half life of weight 230, and chemically again similar to alpha particles and becoming ionium, of with a half life of 300 000 ) ears, giving off sity This again breaks down very slowly different atomic neight and a different den

> as the original element except that it has a

of mulber vol. dynlif 4 movb wole ow writh on a bo her stag 11 varsey tax bo shi like a sata that the property of the stage of the stage of the deliver waised vision. And most of the stage of the property of the stage of the stage of the delivers of the stage of the most waise off the stage of the stage of

THE SERIES BEGINNING WITH LEAD

THORIDM ALSO END UP WITH LEAD

Just how physicists have gone about prov ing every one of these steps we can not explain it ing, been a long and difficult task. The other two verses one beginning with actinium, the other with thornum, also end up





in the whole early that the whole early and the fair early early fine and the consequence of the working the working the man to the working the man the consequence of the consequence of the working the price of the consequence of the consequ

really only one part in 20 000,000 uno yillo earth This sounds like a good deal but it is million tons of radium altogether in the male that there can not be more than 300 to not getting any hotter we can also esti comes from radium and because the earth a large part of the heat miside the carm minutes, From this we have calculated that and the took in fuing point in about tory my radium would heat up its own weight of physicists have found that a small piece of is) ers and so the radium heats up and the ont p) the interior get stopped by the outer eren as little as a p nhead the particles sent rays into the air but in a larger amount tun) cheer of radium sends all its sibus

and the state of t

the first mained wind he is mined the through the through the conduct of the cond

States where medical use alone was more it bet ) ear most of it going to the Linted a pole notid produced about tour ounces of 220 000 per gram Just before the war the Congo and in Canada the price dropped to par viter the discovery of the ores in the 2100 000 (uestily 53 000 000 per onuce) ted muiber to meng and tent It muiber manium Renerally contain only one ounce of on can guess from the fact that 100 tons of quicing a lop it is to get the radium pure miles from the Arctic Circle How long and ridorado mine there hea only twenty six found near Great Bear Lake in Canada The deposits of utanium radium ore have been scientist who norked with Rutherford Laige soddite after I rederick Soddy an English notite which is rather poor in uranium and radium. The richest of them all lie in the Delgian Congo, Thees Minean oves are called

than one ounce per year

bpersant fint if he fired a machine gun, women not have much chance of hitting the an famil at a most sone and bath mant one on a putch black night, into a forest, runting for a pheasant. If he blindfolded himself, not take ann it is as it a man were to go out real truly, out no one can see it, so we can than done, for not only ts the nucleus 'et), ricies at the nucleus? You that is easier and bettieres' to any por try to spoot spines for intion A radioactive atom shoots on ailing THOM CHE WE GO THIS KITTUGLIOLG 23M THE 20-We pure to Bet through to the nucleus itself suntil incred into bed So the problem was not be boinered by the storm when you ne uel down, but in a well built house you will off the roof, or perhaps even blow the chim and snake windowpanes, tear some samples wind howling outside, it will fathe shutlers the same with a nouse it there is a strong partier of several layers of electrons it is side the atom, and is well protected by this ut Arm st unique sharmu aut ut pur 'ot suad rayer tairly easily but radioactivity napfrical lorces on it, we can get at that outer tally, by beating or cooling, or putting electhe outermost iayer of electrons and natu energial benavior of atoms depends upon ith is mindne // e work nuderstand why the MESTS HE KNOW SHE IN THIS Way TECHOOCITY aipna particles can not be changed by any the rate at which radium is shooting off o ian apart again Not so with radioactiv peat the carbon dioxide still more, it begins oxygen to lorm carbon dioride But if we Bins to ourn, that is to say, it unites with the coal to the right temperature and it be temberature and nothing happens But heat and oxygen-leave them together at room cold by electricity or magnetism. Lake coal muks conjq sixs) a pe imprenceq ph pest or scoms do all kinds of things but these ments with all kinds of atoms and have made percentra nave made a great many expert

#### CVR ROL BE SPEEDED UP BY USING HEAT DALIKE OTHER PROCESSES RABIOACTIVITY

eated musber

it so much we do not run the risk of getting ther, and it we can make sure that by using if the price of radium comes down still fur merease in the use of these paints, especially the next tew ) ears we may see a tremendous things which we have to hind in the dark. In electric light fixture, on doorknobs and other on the little tips of the pull-chain for an ont cats and ) on have probably seen it used to breodaseb an no leab book a it ass year

on the matthewart panel of suplanes 1/6 remmons bames and a great deat of use

ιοσγοτια e Saump signs a peut se or bed tedt stody treated with luminous paints, it was used, and sights on field guns and times were neers daing the war Instruments on ships sway it is entirely invisible. This made it the giore is really so feeble that a few yards your watch and clock, when you are near, that while you can easily read the time on dial glow / great advantage of this light is it by night, bou will see the figures on the take the waten into a dark closer, or took at that 15-it 100ks Erectish in daylight thut control with some greenish tooking stun ununces on the dial and the hands had been een watches and alarm clocks in which the way tor many lears you have undoubledly men of what it was at met, and stay's that and brighter, then it drops off to about onepaint has been mixed this glow gets brighter ten light for the first three weeks after the see it begins to glow with a sort of a green tale seur one pl isquim apicu as con poe ure a strange property. When it is hit by the aprending oury os 10 000 or ut 11rd 1-amend amount of radium is mixed with zinc sul uone bunite to muye these a rety tiny trunt at 21 use lead a practical use 15 in lumi mis ranto bine minder eracion and other sim

#### AODE WATCH DIAL SHIRE IN THE DARK PARISONS BYINGS MHICH ASE BYDION RYKE

dre down atter tour days-its half life-it begins to made it reaches its greatest activity and rour hours after the preparation is first is meeted into the sick part of the body in a very thin glass tube, and this 'needle' developed whereby some of this gas is sealed ellective as radium itself. A method has been tion which is a gas—is thousands of times as was found that radon-the radium emana sometimes even balled the patient then it radiating and burned bealthy ussue and the diseased tissue, but after that it went on given it nould often cure a cancer by killing care At tital, it a radium preparation were one and must be handled with the utmost quoscine substances are extremely danger diseases But very early it was found that ra could be used to cure cancer and certain skin to find out whether radioactive materials mals So, just as with 4 rays, doctors tried stances can burn and even hill and destroy is that the rays sent out by radioactive sub and any of the depth of the dep

e que barego cent al. 281-282-264 and 10 i. of the beage one cent al. 281-281-264 and the nucleus publics of the cent and the cent and

#### MEDICAL DOCTORS IN TREATING DISEASE RADIOACTIVE SUBSTANCES ARE USED BY THE

est tot days and even years ter minutes or hours but sometimes they up rainer quickly their balt life being only scene summersity in most cases they break seed comment element can be made radiovinds of atoms and we know now that nearly pen, experiments have been made with all made a new radioactive substance Since considerable time in other words, they had rebr on scuques out its positions for some pomparque ajbpa barricles the aluminum new thing-after they shut off the stream of to be positrons, but and this was the great, or particles, was sent out which they found with alpha particles, a stream of new rals, when they bombarded ordinary aluminum Pierre and Marie Curie, found in 1934 that tene Cure the daughter of the lamous great discovery Prederic Joliot and his wife, A few vears jater brought still another

eget the Abba stantieg google abstracting of the seed and the seed and

If they are after a will be the secure to the secure of th

which the constitution that the constitution of the constitution o

tely important discovery beriments in detail, because they led to a cued Let us look at some more of those ex den sedins in this way, to see what hap HE SUIDARGING DESAG SISTUALIS AURIN 18913 another this was in 1919, and immediately oiui inamaia and Summisuen in papaaans one chemical element into another the had and hy drogen out of them He had changed nitrogen atom together and made ovigen the first time, man had put a helium and a 101 os pare (1) uagozp fu pur (11) uag fxo surfy is not stable it broke up into heavy happened, for this kind of mornine appear sotope, of weight 18 Then something else not an ordinary one of weight 19 but an comporatiny become an atom of muorinealpha particle with weight 4 and then would cienz, weigning 14, actually could catch an And in this way he tound that a nitrogen nu and then bombarded his atom with those duced a constant stream of alpha particles Kutheriord did ne built a machine that pro ponts, he might score a hit I hat is just what turning it in all directions and for several

der titte green particies which looked time glass



-nau arour & sannord pue trede suer 11 uori -use it min more minurin i lid sy seodduc not mose share barts are very important neutrons-spare parts, we might can them remaining 4 come out in the form of single not all, 127 and 104 add up to only 231, the a mule heavier than the other But that is deal at different times, though one is aina) s spont mis and the pieces may differ a good weighs for There is no hard and last rule tern and due Cel mode sugiam tent more 532' spis shire nestly in two, producing one tion (1) at a transfer atom of the weight known, uranium, that is it we shoot a neu atoms are fairly light atoms, but when we try the same trick on the heaviest atom nellum atoms (4 each) Now all of these ton (1) at a boron atom (11) we get three helium atoms (4) Or when we shoot a pro at a lithium atom (7), for them we get two splits evenly, as when we shoot a proton (1) ing usually of weight I but sometimes it two very unequal parts, the smaller one be pist the two add up and then separate into pention (1) That is what usually happens perythinm (9) and got carbon (12) and a t chadwick shot an alpha particle (4) at got oxygen, weight 17, and a proton weight weight 4 at a nitrogen atom, weight 14, and tord originally shot an alpha particle of tuem into different kinds of atoms kutinerparticles of with neutrons we can change that when we bombard atoms with alpha of radioactivity he have mentioned above nork done on it belongs in our present tale to tell-you will find elsewhere, but the early rather, as much of it as we are now allowed groung pomp. The whole story of that-or ety that has come out of radioactivity is the The most recent and the greatest discov

#### DEINCIPLE KNOWN AS CHAIN REACTION THE ATOMIC ROMB WORKS BY THE

brocess in decail radioactive nitrogen we can follow the whole in the ground by letting the plant breathe roots, where later it acts as a good lertilizer trogen gas out of the air and hx it in its thing, we know that alialia can take the m trace all the steps in between yor another carbon dioxide we now hope to be able to know By letting plants breathe radioactive to ton ob on stop at it won the done the influence of (sun)light We know that it supersuces out of simpler materials under which means the putting together of complex The botanist calls this "photosynthesis nater vapor and carbon dioxide from the air biguits, sugars and starches are made out of In the study of plants, too, these tracer materials are very useful Ne have known for a long time that in the green leaves of

hypoid grammer the free reference in the control of the control of

#### 18E BTOOD' VED THE MYS PLANTS LIVE 18E BLOOD, AND THE WAY PLANTS LIVE

no narm at all they will leave the body atterward and do elements temporarily made radioactive then last being around It we can use the lighter and do a great deal of harm atterward by are very heavy They never leave the body, and all other normally radioactive elements Rive radium safts to a person because radium the rest of the body afternard // e could not sport half life, it does not cause any harm to rill the tumor, but because it has such a against a tumor, its radioactivity helps to we use such radio phosphorus as treatment any other bones in our bodies Aiso, when nse nestly ten times as much phosphorus as media it we nave tound that our front teeth buorus is one of the tags we use most, and chemistry when we use them Radio phos, ments, so we talk of tagent or tracer" searce as a tabel of a tag on the ordinary ele t nese temporary radioactive elements can

stream carry it to our mager ups but it in the blood stream, and the blood pow tast our stomach can digest the sodium, esting things about our bodies, in this case and we are finding out a lot of very inter without the slightest danger to themselves, rura way humana can serve as guinea pigs rays and shooting particles into space in casting" its presence there, by sending out tived in his tinger tips and is literally broad two minutes the radioactive sodium has at of radioactive sodium We find that after with sait in it that contains a tiny amount now we can have him drink a glass of water there would be no nay of hading out But tote that sodium got into his inger tips, wanted to know how long it would take be which contains the element sodium and then distance If we fed a man ordinary salt buoshuotus not only shows its presence in There on the earth, adverse we are not all the state, and the state of the state of

tor, and this is exactly what we find region around the Poles than near the Equa more cosmic tays hitting the earth in the this we can figure out that there should be magnet and the earth is a magnet from CULTY electric charges they curve around a sea level Because cosmic ray primaries many rays theive miles up as there are at gone, too There are about too times as gone again, and a good many prinaries are to sea level the secondaries are nearly all atoms And so by the time the rays get down the primaries, get stopped by hitting other the secondaries, which carry tess energy than than primaries As they all move loner down, the earth there are many more secondaries secondaries, and about theive miles above pens a gamma ray is produced, these we can phere and every time such a collision hapthey hit the atoms of the gases in our atmos them 4s they come down through the aut nat cosmic rays, or primaries, as ne call treely charged particles. These are the origing now believe that they are mostly post very much like / rays or gamma rays, but At first we thought they were real "rais

#### VEE MEVITA DVALICIES VAD NOL NYAS SCIENLISIS ROM LHINK LHVI COSMIC BYAS

menta, or and charm to be dividend of seep bed, to surformed them which being being

Here our story about statement they were the but we feet that we should rell you should not but we feet that we should rell you should be more than the statement of the statement of any statement of the New Enow that we can stop alpha, but and we Enow that we can stop alpha, but and we know that we can stop alpha, but and we know that we can stop alpha, but and we know that we can stop alpha, but and we know that we can stop alpha, but and we know that we can stop alpha, but and we know that we can stop alpha, but and we know that we can be story when the statement of th

## ARE STRONGER FAR ABOVE THE EARTH

THE MASTERY OF THE COSMIC RAYS WHICH uzation, but to make it giorious Jake sure that it is not used to ruin our civi now growing up, who will all have to help the case of atomic energy, it is you, who are to see that we use science only for good in good of to do evil, and it is up to all of us Yany scientific discoveries can be used to do sil of us, as citizens and human beings the things we have found out that is up to we can never stop halfway But how to use universe We search for the truth only, and much as we can about what goes on in the more and more things in hature to learn as entists petieve that it is our task to find out stopped before they got that far But ne sernomb, and that scientists should have or the scientists to have invented the atomic Now some people thank it is very wicked

outy one little ' push ' to blow up with eartheven compare it to a volcano, since it needs so much energy is stored up in it that we ciens of such a heavy atom a power house explosives no monder people call the nuzoo tons of TNT, one of our most powerful as bed as at dmod a nt mutnery to bayon can easily see then why people say that one to bring to boal 100 tons of cold water You figuous, stuod thewould coc ood of figures, enough Out of one pound of uranum could come more, but also a terrific amount of power only produces two new atoms, and some neu Now when the uranium atom splits, it not time That is what we call a chain reaction cause it produces its own neutrons, its own brocess has begun it carries on by itself be-What it does mean is that once the splitting ne can nell afford to have some misses. and so on Ot course, we do not always get such a perfect score, but you can see that each of which produces still 4 more neutrons in all, these in turn hit more uranium atoms, and each of those produces 4 neutrons, or 10 trons, these might hit 4 other uranium atoms,

quake violence





B' E C WCDOMell H  $\Pi$  B B E BTapping for subber in Sumaira (left) and Liberia (right) Latex from the cuty drips into little cups get below

recex is an entition like milk, that is low the cuts and the later cozes out and

touch the wood Cups are then tastened be parr mio tue jayer but not deep enough to ratex is optained by making cuts through the through the wooden truth of the tree The rate and different from the sap that flows The later is a thick mulky fluid, quite sepa think of this layer as a sort of much bark

and the wood of the tree truth, we may

in recent , ears a great deal of the natural or caoutenous and is quite different from the original gum,

has now become the raw rubber of commerce

rearment and is combined with sulphur it

rid of the water, then it undergoes lutiner

tag of bateau at it szent ugade a offit bana

the gummy substance When it has thick

actos, nasters the rising and thexening of

to to ber cent Heating or mixing with

amount of rubber in latex varies from about

as cream rises to the top of milk. The

stand these particles tend to rise to the

mixed with a watery fluid, and if allowed to

tue tittà Enumà batrictes of thoose are

arips tato them

persed of our supply of natural rubber. Then lands in the second // orld // ar, we were de East indies // bile the Japanese beid these rubber has been grown in Malaya and the tonua in a spongy layer detween the dark

as l'ara ruboer

the seaport of I ara in Brazal, and even to-day the product of the heven tree is known time most of the tubber was exported from number of dinerent countries, nut for a long ILY ANDRAGAVE DEVER UTCES BEE Brown in a sonice and its product is of the highest qual thes The Brazilian heves tree is the chief comes from the rubber trees of tropical coun all of the rubber of commerce however, trees vines shrubs and other plants rearly obtained from a large number of different called India rubber, or caoutchouc, can be Satural rubber, which is also sometimes

Daians the gifts that the New World brought to discovered America and was actually one of discovered about the time that commissions

KUDDER 15 ONE OF THE HEWEL MARETIALS IN WAS

are fron, cotton wood coal and rubber Some nund ine vinong inese pasic raw materials that play an important part in our ordinary comfortable without certain raw materials be yery different and not nearly so the world in which we live today would

have been known and used from early times these materials, such as iron and wood

bate of a thick juice called latex which is the rubber, or caoutchouc, is the gunimy

[ 972 ]

will not dissolve it It is soluble in turpentine and alkalis except tery strong ones Alcohol proof, and it is not affected by most acids a non-conductor of electricity it is water sorb vibrations and bumps and shocks. It is size and when it is compressed it will ab So will such pack to its normal suche and almost to the breaking point, and when let most valuable qualities it can be stretched its wonderful elasticity gives it two of its

erings and mats saler soles for spoes, and makes rubber stoor cov the road gives us non slip rubber beels and duality is what makes non skid tires stick to ou benerl marks and soiled places. This same cing closely enough to the surface to rub that it you tub it lightly over paper it will per in the first place. All boys and guls know te this quality that caused it to be called rub surface on which it is pressed or rubbed It tional quality makes it tend to ching to any and varied quaities for example its fric of modern civilization because it has so many Rubber has become one of the necessities

Propering tubber in Sumation Resa the fators to pass to exposed to the sum. Part of the liquid evaporates.



sasn Aureu

they can take the place of natural rul let in plastics is exactly like natural rubber but as synthetic rubber one of these synthetic tubber These plastics have become known other substances to take the place of natural tain plastics from petroleum coal trains and we restly ment used the manufacture of cer

th netever electricity is used rubber is used ages s tiajes toj pue Aew radord en in tor insulation to direct the electrical current cause it is a non-conductor and can be used enormous amount of rubber, of course bepittle gadgets The electrical industry uses an electric witing floor mats and a number of such as windshield wipers insulation for and mner tubes and also for smaller things dustry is the largest user of rubbet for tires ways porty pig and little The motor car in



to as in the most astounding number of these qualities have made rubber useful to set crumply

time it gradually loves clasticity and begins air 1/ hen it is exposed to the air for a long grees F It is dutable if protected from the under mederate heat up to about 100 de (except extreme cold) and it stays elastic that it does not lose its clasticity in cold succepts raturable property of rubber is logispied and is much like tvory or horn

elasticity and can be machined or carred and ulcanite or chonite In this state it has no made into a hard, tough substance called it with sulphur in a special way it can be to any shape and then hardened By treating a plastic state it can be formed or molded ductor of heat and does not burn easily in the material it is applied to it is a poor con materials it dries, sticking very tightly to r is applied in liquid form to cloth or other If hen tulther is used as a coment or gine

Der 35 it 16.25 which evaporate quickly and leave the runcarpon preulphique and other colatile inquids and vegetable oils and in niphtha benzine

the later that cause it to have less strength in sommedur sed bas rolos radreb e lo elle prexico is the source of the rubber it is usu The castilloa tree of Central America and

the market value of Para rubber in plantations in Ceylon and East Africa trees of this variety that have been planted bated and has more dirt and bath in it The tained from the wild trees is not so nell prethat of the herea tree, and the rubber ob latex of this tree does not flow so treety as Det is obtained is also a native of Brazil The The manibot tree from which Ceara rub-

#### NUMBER OF TREES AND PLANTS LATEL CAN BE OSTAINED FROM A

the East Indies, and more recently in Brazil used to form the great plantations of cult. the species of runner tree that has been most which ranks highest on the market. It is also nave said, the original source of Para rubber Venezuela and the Guanas This is, as we in the adjouring countries of Peru, Colombia leys of the Amazon and its tributaries and unportant, growing wild throughout the val the Brazilian heves rubber tree is most

of natural rubber are as follows and larger trees. The more important sources The best rubber is obtained from the older is free from dirt, back and other impurities varieties of trees are planted, and the rubber per is of highest quality, as only the best the trees grow older This plantation rub quality and amount obtained increases as nees can be tapped for the latex and the then takes seven or eight lears belote the lings set out in rous like vast orchards. It tions, as the land must be cleared and seed sums of money to establish these planta of natural rubber it has taken immense in 1941, and these formed the chief source cultivation when war started in the Pacific tully cultivated Atthons of acres were under targe plantations in which the trees are care Our century has seen the development of LEGOWTI 25 WILD PUDDET

dies, Central America and Mexico This is South America Africa, India the East In wild in tropical and semitropical regions of came from trees and plants found growing deginning of the twentieth century tubber source of commercial rubber. Until about the dozen have been used to any extent as a chouc Of all these, however, less than a substance of the nature of rubber, or caout pies that have latex containing a guminy trees, plants, shrubs, vines and even vegeta There are many hundreds of different quite so good as natural tubber quet tubes nothing has been found or made rupper overcomes this loss of strength For the addition of about 30 per cent of natural strength, especially tires on heavy trucks automobile tires tend to heat up and lose that some types of synthetic rubber used for stands up well under heat it has been found dualities which they lack, 45 we know, it the synthetic rubbers and give them certain that it will mix, or combine, with some of One valuable quality in natural rubber is portant saving in the use of natural rubber recovery of serap (old) rubber makes an unpure rubber tor articles such as tires. The reclaimed rubber is also used to mix with is used chiefly for goods of mierior strength This is known as reclaimed rubber, and it tubber can be dissolved and used over again out rubber atticles are not a total loss, as the the rubber serves as a plastic binder It orn articles fillers are used to give more bulk, and sary For instance, in floor mats or molded For many purposes pure rubber is not necesstout tabrics are embedded in the rubber where great strength is required, cords or burtap in fire hose, tires and other articles made of wool fibers set in rubber covered made with rubber, also carpeting which is

There are Hoors, Hoor coverings and mats etasets on pencils in toys and playthings, elastic bands and tor all kinds of games and sports, the rubber nesses to mark papers the rubber in balls nseq ph punks and stores and other bust bost ource to esucet bostage stamps, stamps many kinds of tubber stamps used by the widespread use For example, there are the important uses will give you an idea of its suddenly to vanish Some of the small but of living would be like if all the tubber were rubber in it, you would wonder what our way that you see or touch in one day that has If you nere to notice and count everything

#### FOR THOUSANDS OF USES WE DEPEND ON RUBBER TODAY

sadid ayı ur washers or gaskets to make waterught joints

ing fixtures and pipes for water has rubber stroyed by fire Every house that has plumb factories and everything else that may be deessary as water to protect our towns and nater and other liquids thre hose is as necthe most important uses is for hose to carry hospitals or for soldiers and campers. One of and boots, and special sheets or blankets for We use it to naterproof clothing, shoes

nogen Oregon

The production and Africa The production and preparation of rubber arres etcy much depending upon the kind from the shorts and since the rubber from the shorts and since of the a obtained by crushing the stems or the rubber and making with both and the roots and mixing with both water to experient

them see, no bounds 7 ordinar and not set in in the seed in the great section of the section of

| 510 40<br>341 904<br>1 300 61 1 | 196 £<br>196 £<br>201 9<br>£11 02 | 150 t<br>150 t<br>150 t    | 11 500                   | 626 or<br>626 for<br>626 for<br>626 for | 016<br>016<br>026 |
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| TATOT                           | ATRICA                            | XITE<br>(IV<br>IGVA<br>REX | AND<br>AND<br>AND<br>AND | AST<br>AND<br>1 AST<br>1 AST            | 243               |

The world production of rubber in long times (2 s to pounds) as green in the follow ing table from a report of the United States Department of Commerce

CULLIVATION Haift the cribtostegis has been put under are also being experimented with and in wild rabbit bush and the one year castilla acte on poor land. The desert milkneed the r greon was appe to broduce 100 bounds ber experiments on a 600 acre farm in Georgia with which Thomas / Edison made some uare | cen chonsored by the United States Other sources of natural rubber which tubber per acre than the wild variety does produces more than twice the amount of continuestern states. The cultinated guay ute or 30 000 acres in California and other ment tostered the planting and cultivation casily eparated The United States Covern no but to to so ber cent of resins which are der to extract the rubber. This rubber has brant and then crushing by machinery in or is optained by breaking the stems of the to ber cent of the world a tubber 't he rubber occome the guayule shrub produced about production was much less than it has since Bend area of Texas. In 1910, when rubber tends across the Rio Grande into the Big northern Mexico and its wild growth ex The guay ule plant is a shrub native to

#### THE RUSSIAN DANDELION A SOURCE THE RUSSIAN DANDELION A SOURCE

a similar way by the natives toots from which the rubber is extracted in guese // est Africa (Angola) has tuberous nion the fibers. The examina plant of Portu in hot water and the rubber then separated phia and other tines. The roots are crushed a root rubber from the roots of the landol South Sudan in Airica the natives prepare species of these vines. In the Congo and the wild rubber exported has come from other in South Interior in Borneo much of the species of subber producing vines are found vines is the landolphia vine of Mrica Other and labortous. The most important of these tust tapping and gathering the latex is slow tines are so widely scattered in the forest riffed by careless tapping Then too the is that the times are liable to be injured or supper is obtained The difficulty with these duce a latex from which a good quality of plants in tropical Africa and Asia which pro pesides trees there are vines and chinbing

the atthe of the come only the come of the com

# THE SILK NUBBER TREE AND OTHER WILD SOURCES OF LATER

The tree ability is commonly known as the common and beginned as the common and the common and the common and the common and the compact of the conference and the common and the compact of the conference and the common and the compact of the conference and the common and the compact of the conference and the common and the common

than the lara rubler. This tree has also

erge grande othi sugges out Trimbil sh Trisspanier the portion, that it is not in a time of time of timesery



per we know it is still gum conc is not let the run noro 10 1900th Stul rean rannini due Vid arew ยวเมพ รอบเมระนา มรถบนา รอดวิ rubber is separated a neuri cars to factories where the yuer ut to squb no sans nt sapuration Buot padding st 11 uaqi pue emomine jo nomo pe our (a pinbit xore) door non spogratu maport

finend usin a to san yan rupper prepared in this crude meats his and the nee the

acted as a preservative as it does in smoked up on the paidle. The creosofe in the smoke dried in the smoke again and real at smore the paddle would be dipped and dry and would also absorb some of the s surst pre The thin layer of rupper would then held and turned in thick smoke from bengue, represente a composition of the contract of the tubber for shipment was to use a stick or the original native way or preparing the

compressed into plocks or other shapes cruthly ribbons. These are dried and are washing machine coming out in sheets or up and passed through grooved rollers in a The rubber is then washed and dried and cut rice that is come together in a spongy mass.

under the addition to make the that we cough -bit pice soil raise out most ratel title inc ma or nece can be separated by a maci me watery that the rubber from water taries annier of caoutenoir is epitatica nom inc net in tanks to a central station where the the latex to griftered into backets, er ear-

Bunktet to spedtnu fende tem trois a provide methods are me tater es successions are nonre or sour. Descrided down to the base of the tree whore the cup nguera cut which tents the a trouping run awn the truth all of them connected make a series of 4 sents in a certical lit e, up t to catch the litter mother method to the nee and I me summ enter of the boint of the is a timere a subtest ente on tont signs of the

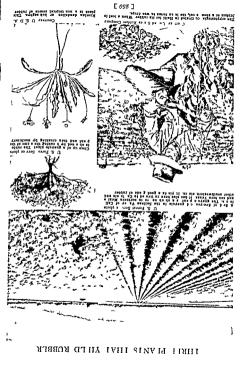
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methods of tapping have been in use. One need to keep from cutting too deep Several is now produced special tapping knives are On plantations where most of the rubber

eventually the tree died innied inneus or for to attack the wood and deep into the nood of the trunk. This per pesting my et penesty put they often cut too exez to ent, thront it the truly ture the forex from the wild trees in the forests used small Unginally the natives gathering rubber

is done carefully quee for many years provided the tapping trodically, and in that way the tree will pro ratex which contains the rubber is tapped pe destroys the plant. From the rubber trees the the tubber from the fiber This, of course



of young per erections of the tribber plantatons include everal at 100 occurs including the tribber plantatons include bor but with large stees of the most suitable hand relevant and the trees planted in rows the trees and the trees are the trees are as a feet again in the tows and the trees are 15 feet again which makes

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#### IMMONE TO PESTS BUD-CRAFFING MAKES THE TREES

channel methons today et the result methods of most and a state of the control of the channel of

# DOW THE PLANT BREEDERS IMPROVE THE QUALLITY OF OUR RUBBER

TIM cinde hand methods were largely done away of scientific research and invention in which of plantation rubber brought with it an era can be carved or machined. The production molded while it is still soft or when hard it known as vulcanite or ebonite This can be the rubber becomes the hard tough material combined with about 30 per cent of suppur ity it is brought to a greater heat and dinary tubber of different degrees of elastic s 2 to 10 bet cent of sulphur we get the or ing them it is compined while heated with cpret duality This process is called valcaniz sug sol qu'à sug the elasticity which is its comprised with sulphur to give it toughness my and if warmed it gets st chy It must be

source to as the state of the s

### PRODUCTION IS USED BY THE WORLDS

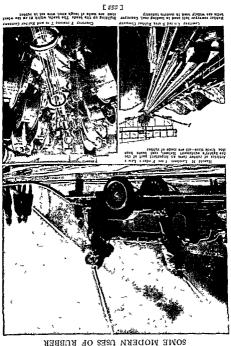
ont pad begun junited production Valley in Brazil and by the time war broke gion of about 2 500 000 acres in the Amazon 1928 the Tord Company secured a conces acreage has increased each year since in too oop acres under cultivation and the Puperis in Africa By 1941 there were nearly ber Company leased about a million acres in by their needs in 1925 the ruestone Kub per companies established plantations to sup-Only in recent years have American rub Dutch companies in Sumatra and Java plantations in French Indo-China and some in Airica Prench companies have tions in Ceylon India Malaya and Borneo eget yets nutrey companies pare planta plantations are in the East Indies and south The largest n ost numerous and oldest

and to maintain this production to other a modern piantation into production the trees is only a part of what must be done becomes greater. The planting and raising of trees grow older and larger the yield of latex before any tubber is produced at all As the ices of the long process to be gone through to most regular. This in outline gives some the rainish it is greatest where the rainfall though the growth of the trees varies in d fier the number of trees per acre to about 100 quality of latex are removed This reduces nb to the required standard of yield and During this time the trees which do not come tree has reached the s ze for regular tapping during the following three Jears or until the made This is continued from time to time tree is tait enough for a test tapping to be About hie years after bud grafting the DATIL THE TREES ARE EIGHT TRARS OLD

## REGULAR TAPPING DOES NOT BEGIN

-22.55-

about 220 trees to the acre. As the seeds spring up the seedings in each seed bed are only two of the strongest plants to each bed only two of the strongest plants to each bed most successful is left standing.



Arddns more than 95 per cent of the world's rubber queed at the time of the Japanese invasions per plantations of the gast indies that prothese seedlings grew the hule system of rub set out on specially prepared land From shipped to India Cellon and Singapore and ings grew they were carefully packed and New Gardens, in England Il hen the seed nam 1004 were planted in greenhouses at export seeds or plants. The seeds that wich oly of good rubber and it was torbidden to the country, as the Brazilians had a monop heves tree He had to smuggle them out of went to brazil and collected seeds of the Brazil, so an Englishman, H. A. Wickham the East Indies was not so good as that of of superior trees. The rubber of Asia and plantations for the planting and cultivation to 1000 propert about the establishment of inpoer in the last part of the nineteenth cen ment the demand for a better quality of people get busy to bring about the improve SILONS DEED TOT INDIONEMENT IN SIN STRICTS

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ots tried to finish of ways to overcome this drawbach, and among them nere Charles Coody ear of the United States and Thomas Hancock of England

The great trouble about all such uses of intubber, or caoutchout, was that in damp, warm weather it became soft and sucky and in cold weather it became stiff. Many invent

office alled matchinication in the total water and an armonication in the total and a matchinication and specialists in on color and an area of the state of the st

# INSORTVAL DEE OF RUBBER WATERPROOFING CLOTHES WAS THE FIRST

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chemist found that this gum made an excel

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said, to the time of the discovery of America. The historian Herrera, who wrote the ac-

By Thomas Cordon Lawrence BIOLOGY

# ARTAL SHADES WELL INSIG DELINE

teeth it is thought that it should eventually their teeth. All of the buds grew to full s zed tens or grown cats which had lost some of planted them into the mouths of other bit, tooth buds from week-old kittens and trans-Dr Harry Shapiro removed some start to grow as Ittle tooth spnq or and of an male such as cats and dogs titel carried out n New York The teeth of men news for persons who lose then teeth was Another discovery which should be good lost in the operat on until the following spring and laid the reggs uset little blood is

tripor month of an older person who has lost some nom a child's mouth and plant them in the pe possible to take badly overcrowded teelh

the Jear Results nere much better than with ist ng surg cal alloy came into use during arteries together with vitall um a non fri A method of successfully weld ng large

the previously used method of attempt ng to hearts were substituted some of them lived inals In the case of the frogs where n new

no ill effects have been not ced in the ani s carried out in half a minute or tess 50 far away as it nothing had happened The each anmal had two hearts both pump ng vas not removed so that after the operation tabbits in these an mals the or g nal heart nto warm blooded animals—dogs cats and another frog In 1945 Sin 1s n transplanted new hearts a trog and then anserting a new heart from

tional exper ment of removing the heart from

of Moscow Russ a performed the sensa

be ngs in 1944 Professor Vikolai Sinitsin

brocedures will be successful with human

another always with the hope that the same

transplant whose organs from one animal to

States and abroad Biologists learned how to

experimental biology both in the Un ted

1 1045 in the medical sciences and in

[tra] Bundles delivered by para bute to American Marives on Iwo Jing, Much blood planns was dropped in th

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onderances similar to penicilin in their who helped develop it as a hiesaying remedy DE REDST B Chain of Oxford University Pemening and to hir rio vard in Florey and ing of London University the discoverer of medicine was given to Sir Alexander Flem the 1945 Nobel Prize in physiology and

### WORLD WERE AWARDED A NOBEL PRIZE THE MEN WHO BROUGHT PENICILLIN TO THE

phoid virus diseases, malaria or the common biereut inpercujosia jebrozy il buna ily cityer benicily it not suits drugs cure or meningura anthrax and some gas gangrene near miecijous some preminonia some against carbuncles blood poisoning some is now established as an effective remedy tive against only a tew types of bacteria it crim vitroogh benicijin is scinsif) enec broduced by a common green mold-peni surreprice especially the marrelous juice intensive research continued with new

st poold avaised Rh positive blood is a violent, and often fatal reaction if a negative individual s cells which may cause causes the production of substances in the an kin negative person, but this transfusion insion of kh positive blood does not injure minte an an bosture betson The last trans translusion of kh negative blood does not tive those facking it are Rh negative A with the Kh factor are said to be Rn post Dr Philip Levine eight years ago Persons tery of Rh the blood factor discovered by Progress was made in unveiling the mes

### RH PACTOR IS IMPORTANT IN TRANSFUSIONS END THE IF A PERSON HAS OR HAS NOT THE

attermath of gunshot wounds in the head and the convulsions which are often a serious prain it was found to prevent scar formation fibrin film was used to cover the exposed many new purposes In head wounds when cloped from blood plasma was used for I mun the solid elistic material de-

n unia painalui protection to 39 per cent of the children experiment it was found to give con plete and ) oung children against measles In an the material of choice in protecting babies jaundice It was also said by doctors to be tound to provide a weapon against infectious the Red Cross for the fighting forces was gionatin, a by product of blood collected by the blood in medicine and surkery Gamma Advances continued in the u e of parts of sew together the cut ends of the artery

capable of reproducing was found that the mushroom caps were stul opened Although the air pressure in the tubes was only about 1/2000 of normal, it nad been sealed thirty hie years ago were trated when glass tubes in which mushrooms to endure unfavorable conditions was illus The remarkable ability of some organisms

(1) 10 th minimit) minen that our intestinal bacteria also make ribo B (thiamin) Yow it has been discovered enem es some of them manufacture vitamin all of the bacteria in our intestines are It was already known that by no means

passasip os cancers to disappear in 43 per cent of mice that injections of folic acid caused certain permicious anemia. One investigator claimed of red blood corpuscies and is helpful in that folic acid swiftly increases the number artificially) for the first time It was found the vitamin is group, was synthesized (made In the field of vitamins folic acid one of

matemai swim away to avoid any contact with the the bodies of dead sharks The live monsters pomb composed of substances taken from newly developed substance It is a stink or situen can now be prevented by using a Attacks by sparks on shippreched sailors ing the growth of certain germs

me was tound to be very effective in check son greenouden broqueed by a soil bacil toot lungus and in bacteria growing in the green plant called Chlorella in the athlete's nuts partdock buttercups a microscopic effect on germs were found in water chest

Blood in tested to see if the Rh factor is p esent.





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By Morris Mondisk

SCIENCE-CHEWISIKK

combiere ninety two, which for so long was considered elements have been added to the list of mean that in one year four new chemical ratory It these reports are confirmed it will 62 and 60 had been created in the labor and that two more new elements, numbers trues of piutonium had been found in nature borts were printed revealing that sman quan exist to negline, toward the end of 1945 re creating two new elements which did not mas assumed that man had succeeded in time the news of the bomb was released it to be uranium (with 92 protons) At the with the highest atomic number was believed (with 94 protons) Previously the element 32 beotous in the nucleus) and plutonium produced these two are neprunium (with two entirely new chemical elements were nmod process of making the around and ni thres of pees were shipped to the island

uniess insects transferred their polien whole sums of the plants would not produce truits dramed on water may be used again Since ranged in descending steps so that the mio the dry ground The gardens are ar Cicle is used to keep the water from been at elect the gravel of the island Asphalt the con ocean to water the plants that are rooted in gardens there using water distilled from the peppers the Army established hydroponic tomatoes radishes, cucumbers and green south Atlantic Ocean, now produces lettuce rocky, dry desert land and cactus in the carried out Ascension Island, a purpoint of bourcz (soijjeze chemiczi gardening) were Some large scale experiments in hydro

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y new group of apparatus called although

Spown here is a piece of chicken festiver (10th a pile of chicken festivers festivers and e hade by the statutes and its sittle work.



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### DAZE IS ARED TO WERE Y NEW PLASTIC MATERIAL FOUND IN WOOD PULP AND SAW

upholstery

Class fibers are being used mare extensively for clothing. Exceedingly soft and and wool

A new chemically ireated cotton (related to celeaness) will not tot even indugh kept monst, may be used for swinnings and an most, so the resistant and may be used for

Other fabres have been the state of water leaves the state of water feeling the water feeling the state of water feeling the stat

aveay bas aids a tree), cloth is made without having to nobicsi conunies by pounding the bark of the exception of the cloth made in some first time in the history of the world (with with plastics in this case for perhaps the produced by cemening together cotton fibers Dental towels almost as cheap as paper nere are now thrown away or used as lettilizer cpicyen teathers millions of pounds of which dry strength than nool was made from were introduced A soft cloth with a greater and water in 1945 more new artingial fibers materials as the casein of milh, and coal air been made from compounds of such unlikely in recent ) ears many new textiles have

the plague controlled

be destroyed and an epidemic of 43 phus or

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days the entire rat population of a city could be destroyed and an epidemic of typhus or the plague controlled

In recent years many new textiles have been made from compounds of such unlikely materials as the casein of milk and coal air and water. In 1945 more new artificial fibers were introduced A soft cloth with a greater dry strength than wool was made from chicken feathers millions of pounds of which are now thrown away or used as fertilizer Dental towels almost as cheap as paper were produced by cementing together cotton fibers with plastics. In this case, for perhaps the first time in the history of the world (with the exception of the cloth made in some tropical countries by pounding the bark of a tree) cloth is made without having to spin and weave

Other fabrics have been improved so as to make them water repellent freproof and weather resisting. They possess greater strength durability and warmth and are less given to wrinkling shrinking and losing shape. Linen tablecloths were coated with a transparent film of vinyl butyral Gravy spilled on such cloth may be wiped off with a damp rag ink may be removed with a stream of water leaving no state million.

A new chemically treated cotton (related to celanese) will not rot even though kept moist may be used for awnings and fish nets is fire-resistant and may be used for upholstery

Glass fibers are being used more exten sively for clothing Exceedingly soft and springy cushions have been made of glass wool

### MATERIAL FOUND IN WOOD PULP AND SAW DUST IS USED TO MAKE A NEW PLASTIC

The war made the waste found in some of our essential industries seem a really shock ing thing One material which was formerly thrown away the essential part of wood pulp and sawdust called lignin is now being used to make a shiny, black plastic to condition soil and to control dust on roads When paper is made from wood pulp great quan tities of I gain are left unused A fine quality hard wallhoard is now made from wood shavings chips and sawdust by treating these materials with chemicals and compressing them By treating soft woods with the chemi cal methyl urea we can make them as hard as oak or walnut These woods may be made to resist fire and decay may be dyed beau tiful colors and may be coated with stainless steel and other metals

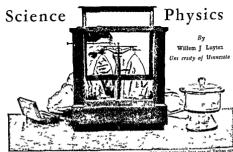


Shown here is a piece of chicken feather cloth a pile of the feathers and a roll of the garn which is made by binding the feathers with a little wool.

A new group of substances called sil cones some of which bounce like rubber but can be shaped like putty were recently devel oped Active research continued in this field during 1945

Some large scale experiments in hydro ponics (soilless chemical gardening) were carried out Ascension Island a pinpoint of rocky, dry desert land and cactus in the South Atlantic Ocean now produces lettuce tomatoes radishes cucumbers and green peppers The Army established hydroponic gardens there using water distilled from the ocean to water the plants that are rooted in the gravel of the island Asphalt like con crete is used to keep the water from sinking into the dry ground. The gardens are ar ranged in descending steps so that the drained off water may be used again Since some of the plants would not produce fruits unless insects transferred their pollen whole hives of bees were shipped to the island

In the process of making the atomic bomb two entirely new chemical elements were produced These two are neptunium (with 93 protons in the nucleus) and plutonium (with 94 protons) Previously the element with the highest atomic number was believed to be uranium (with 92 protons) At the time the news of the bomb was released it was assumed that man had succeeded in creating two new elements which did not exist in nature Toward the end of 1945 re ports were printed revealing that small quan tities of plutonium had been found in nature and that two more new elements numbers 95 and 96 had been created in the laboratory If these reports are confirmed it will mean that in one year four new themical elements have been added to the list of nunety two which for so long was cons dered complete



Cou esy Carnegie Inst rate of Techno

Dirained the year that has passed physical custs were buser than ever. They discovered many new facts in nature and in centred a lot of new machines and deviets and gadgets. Most of them however have been working for the government on war research during the past few jears and many of the fings they have done are still secret. They was the property of the past few jears and many of the finest past have done are still secret. They years before we get the full story of all they did during the last, year of the wild during the last, year of the wild.

The gratest thing the scientists did—and perhaps we may even say that it was the greatest discovery ever made—nas to find a way of using the energy of the atoms score in the atomic bomb. Not because it was a bomb that is something to be used to blow up cities and kill people but because for the first time in the whole history of the world human beings have found the secret of what it is that keens the sun and the stars shiring.

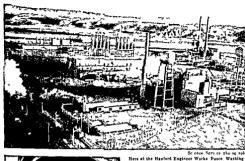
Before they could make the bomb they had to find out what goes on inside the atom and this took fifty years of study one generation of scennists handing to the next its discoveres. Not August y when the first bomb was dropped on Hiroshima but July 16 1045 will be a red letter day in the instory of science. That was the day when the first atomic bomb was et off at Lo Mamos in

the deserted mountain region of New Mexico There after years of hard work and many disappointments and discouragements that were almost heart breaking secretists knew they had succeeded at last. They had opened up the tremendous store of power inside the tuny atom.

When the news came nearly all the wold was unprepared for it, and most people sim ply could not believe it.—except the children in America who had read the come strips and knew all about Buck Rogers and Super man and Captam Varvel and the other our acte one. The children were really more fa mular than most grownups with all these fantastic scientific affairs. But this fantastic affair which is true and no make-believe, is

the greatest mare lof all.

The whole story of how at was done we may not yet tell. Some of it you will find in the chapter on Atomic Energy, but a good deal of it is dangerous Loowledge and the yournments that share it have to keep the secret a little longer We know of course of the count of keep it always for our the same thing and soon others will be able to solve the problem too As a matter of fact scene tists do not believe in keeping ther discoveries secret the praceleum to Park how per course secret the procedure of the same thing and soon others will be able to solve to solve the problem too As a matter of fact scene tists do not believe in keeping their discoveries secret the praceleum Energy know per



Here at the Hanford Engineer Works Pasco Washing secret production work on the stemic bomb took

A ferbuician operates an electron microscope In the

haps better than anyone else that if we all want to go forward we must all work to rether and must share the things we know and the new things we find out To the scien tists our earth has been One World for a long time

Now that we know the secret of atomic energy and know at least how to use it to get an explosion the next thing to do is find out how to use it in everyday life-to fly our airplanes and drive our locomotives and per haps even heat our homes and run our wash ing machines with it Perhaps some of you who read this chapter will help to solve the problem

We can mention at least one other triumph of physics. Even though it did not all happen during the year, it was published during the year We mean RADAR It too played a very important part in the winning of the war, as far back as the Battle of Britain in the fall of 1940 At that time the English used it to tell them when and where the Ger man planes were coming over So they were able to use their own few planes in the right place and to beat back the Germans

The idea of radar is really very simple it is like a blind man who walks around tapping the ground with his cane when he comes close to a tree his cane will tell him where the tree is and he can step aside and not bump into it. In radar we use instead of the cane a beam of invisible light. When it hits an object it bounces back to us and we get the echo of it

The farther away an object is the longer it will take for the beam to come back. Radar can be used by those on the ground as we have explained to scan the distant skies for approaching craft. In peace or in war its beams can be sent out from ships to guide them through darkness and fog and into strange harbors During the war with Japan it directed the fire of guns against ships far out of sight. It is also valuable to pilots

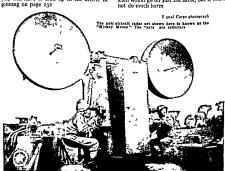
If a plane is flying in a cloud it sends out its beams in all directions and on the instru ments as we now have them a luminous finger spins around on a screen When a beam hits something a light spot appears on the screen and the pilot gets a rough picture built up from these light dots of the object at a distance Even on a clear day the radar eye can see ten times farther than we

can with ordinary light. Exactly how it works you will have to look up in the article be ginning on page 232

Radar can usually see through a cloud But when the clouds mass together and be-

come very heavily laden with rain they too will bounce some of the radar beams back In this way the hurricane that struck Miami Florida in September 1945 was spotted on the radar screen and followed all along its course The Weather Bureau is already

thinking of putting radar to use for weather predictions There was one very special way in which radar was used in the war that we want to tell you about By mounting a radar sending set in the nose of a shell such a shell or homb could be made to smell its target Before this when firing shells at airplanes for ex ample either the shell had to be set to ex plode when it hit something or it carried a time-fuse which made it explode after so many minutes In the first case the shell would actually have to hit the plane If it missed by even an inch the plane would es cape unhurt. In the second case one would have to guess somewhat in setting the time of the fuse and hope that the enemy plane would be somewhere near when the bomb went off If there wasn t any plane near, the shell would go off just the same, but it would





Now with the new built in radar set beams are sent out in all directions from the shell The time it takes for such a wave to go out get bounced and come back is recorded inside the shell by a little machine When this time of going and coming back is short enough then the object-a plane perhapsis close enough to be damaged or destroyed by the explosion of the shell Before it is even fired the shell is set to explode for just that time and that distance Destruction of the target is thus made certain. Some experts estimate that with such radar sets built into rockets or set planes loaded with explosives such planes could be guided toward their target like homing pigeons. They would ex plode at the right time without any human guides being in the planes at all In this way it might be possible to meet an enemy fleet of bombers a hundred miles away from their dest nation and explode the buzz bombs among them That would make it almost impossible for planes to get near big cities

We do not know in detail how the present atomic bombs were exploded. But in the fu ture they, too could be exploded by using radar sets built into them

We want to mention one more contribu tion the physicists made to the war That is the log-disperser-the British call it FIDO This is really not much more than a great bg heating unit that burns thousands of gallons of gasoline per hour and blows the vapor into the ar Fog-dispersers are used around airfields and when a dozen or so of them are lined up all around a landing strip it is possible in a short time to blow away,

dissolve even the densest fog that may hang over the feld. Hot gases rise as you know In rising they must push up and aside the heavy dense foggy air This device was specially helpful when a large force of planes that had been out on a mission would come home and could not land because of the dense fog By the use of FIDO in England and in the Aleutians the lives of many pilots were saved

A few physicists have still been working on research that had nothing to do with the war especially on cosmic rays and what they really are They have been trying to find out more about that new and strange particle that we call the mesotron-what it is and where it comes from It seems that when the first cosmic rays-which are really protons that is small part cles that carry positive electricity-strike the upper layers of the air they produce mesotrons up there Sometimes these behave like fast electrons the very I ght particles that carry negative electricity Sometimes they behave more like protons themselves only they seem to be a little lighter

Other things the physicists have been working on are new ways of testing precious stones such as diamonds with X rays and ways to examine the surfaces of solid bodies with the electron microscope And of course a great deal more has been done in the line of splitting atoms of changing one chemical element into another and of trying to learn how the nuclei of these atoms that is the central cores way inside the atoms, are built up





Sylvania Electric Products soft, restful effect in lighting is lained by placing fluorescent lamps continuous cover in the ceiling or

By Samuel Baker

Dean, Schools of Technology, International Correspondence Schools CCIENCE, the word comes from the Latin scre, to know The scientist strives to know exactly what everything in the universe is made of, and how He searches for the laws of nature by which all things are ruled. from the energy within the atom to the motions of the distant star-cities. For thousands of years men have been adding to the sum total of human knowledge and this accumulation of knowledge has helped each genera tion to live a little more comfortably. This is true, at least, in the part of the world where we live There are still places on the globe where science has made almost no headway In those places, life is simple, and hard There is little protection against disease homes are uncomfortable, and the forces of nature are feared

A motion picture of the onward march of civilization, or science, might be made around the changes in home construction. Take one element-the arrangement for cooking our food Once an open fire in a cave sufficed. though it filled the cave with smoke Then came a hole in the roof to let the smoke through, next, a chimney to provide a draft But much of the heat, as well as smoke, went up the chimney, so stoves were invented. The stoves burned wood, and they had to be refueled constantly Coal was found It burned longer, and more evenly, but it was dirty, ashes made a problem, and there was still an element of guesswork in cooking Your grandmother's recipes called for "a medium

oven," or "a very hot oven " Modern cook books are made by scientific cooks All meas urements are exact, including the degree of heat and the number of minutes at which the heat must be maintained Today stoves can be purchased that burn gas or use electricity, and have automatic heat controls and time controls. Some ring a bell to remind the housewife that now she must take her cake out of the oven Some turn the oven off at the right moment

Stoves of tomorrow will be even more ad vanced, for their designers will put to use even more of the findings of science Heat will not be wasted as it is today in top-of the stove cooking Arrangements for fireless cooking, and for quick cooking by steam under pressure will be built into the stoves

The stove of tomorrow is only one piece of equipment in the kitchen of tomorrow, and the kitchen is but one room in the home of tomorrow Let us see what the architect has to say about the house that science will build for us to live in and enjoy

The new home is planned to meet the needs of our new ways of living Ever since the first World War, women have been en tering lines of work that were formerly fol lowed only by men This trend is expected to continue It means that in many families the wife as well as the husband will go out to work, not so much through necessity as through choice Where there are children in the home, the mother will need more and



Coursesy Owens Ill no s Glass Co Glass will be used in many more ways in the houses of the future The giats wells turrounding the working space in this kitchen give more daylight for the housewife They are good fooking themselves and easy to keep them.

more time to devote to her family Therefore the new home must be easy to run

Advances in technology will continue to shorten the hours of labors so that adults will have more time for hobbies and outdoor recreation. The architect is aware of this. He knows, too, that improvements in transportation are making it possible for more people to live farther away from the crowded cities. The planning for the new homes therefore, gives more attention to spaces for recreation and for living outdoors.

The average home of tomorrow will be a low, rambling building without cellar or attic. The scientific advances which make it possible to build this kind of house are the result of long research and experimentation in types of building material in methods of heating and air conditioning and in the development of electrical component

The beating and air-conditioning equipment will be in a room on the ground levi rather than in a cellar. The kitchen will be an efficient little factory, equipped with labor saving devices mostly electrical, for cooking dishwashing and laundering.

In many homes there will be no separate during room, but during space will be provided in the part of the living room nearest the kitchen. The bedrooms will usually be on the ground floor, in a separate wing of the house. If there is a guest room, it will serve



Courtesy Libby Owens Ford

The glass wall which brings the suidors into the living room is made of a special insulating glass made of two or more panes with a realed in dehydrated air space be tween them. It lets is the sunskine her near the contraction of the constitu-



Courtesy The Tappan Stove Company A gleaming white gas afove which has automatic heat control, a lighted even with a window through which you can see the food cooking and other helps.

also as den for unused space will be avoided There will be plenty of bathrooms plenty of closets and built in dressers and other furni ture. Overcrowded fussy rooms will be

assumed these new houses give the impression that they are all windows. That too is soon that they are all windows. That too is soon that they are all windows. That too is soon that they are all windows that they are possible, which seem the proposition is the proposition of the

Some of the new important developments in materials used for home heterotists have been dead to the work of the chemists These desired how to impregnate heterotists have learned how to impregnate on the most of the themicals that increase list display and its resistance to fire. They have also made paints that are waterproof and resist from

The use of plywood as a building material or for production of furniture has been greatly expanded by discoveries in the new field of plastics Plywood is made by gluing

together several thin layers of wood with the grain in each layer at right angles to the grain in the adjoining layers. This makes tough wooden sheets for use in walls and ceilings. When such sheets are impregnated with a transparent plastic, plywood pands show clearly the natural beauty of the wood.

To increase safety in moving about the house at night luminescent or phosphores cent plastics will be used for switch plates lamp shades and bases telephone receivers and starway rivers and railings

More use will be made of metals especially aluminum magnesium and stainless steel for window sashes and other structural

and decorative purposes By applying the principles of physics and chemistry new methods of heating and air conditioning have been developed which make houses both healthier and more com fortable. The new heating system will be easier to operate than those to which we have been accustomed. In the new system known as radiant heating hot water or steam is sent from an automatically fired heater or boiler through cods of pipes embedded in the floor and sometimes also in the ceiling and the walls If a hot air unit is used the hot air is sent through ducts in the floor. Thus with radiant heating there are no rad ators or registers. In hot weather, the house would be cooled by pumping chilled water through the radiant coils of a hot water system, or cold air through the ducts of a hot air system



Washing dishes can almost be fun when your kitchen has an electric dishwasher like this.



Courtesy Deep Freeze Motor Products Corporat on In such deep-freezing units as this, people will be able to afore fresh foods, including ment, milk and vegetables preserving all their freahness.

The term air conditioning has come to mean more than merely cooling the house in summer. It now means also adding mosture to the air and heating it in winter removing excess moisture and cooling in summer and year round filtering and cleaning of the air some of the filtering methods depend upon my uses of electricity.

Advances in lighting have made the old massive ceiling fixtures with their glaring lights seem entirely out of date. Scientists, experimenting with electricity and its effects or metals and cases under various conditions have developed fluorescent lamps which create the color of daylight Fluores cent lights have little glare and give off much less heat than is given off by the familiar incandescent bulbs. The fluorescent lamp may be the chief means for lighting the home of tomorrow A soft luminous effect for gen eral I ghting is furnished by using continuous coves in the ceiling or in the walls above the windows with hidden fluorescent lamps in the coves. Where strunger light is needed direct "downlight" is built in-for example, over the reading chair or the drewing table or the kitchen store

M he attention is being given to arranging the I ghting so that it will blend quietly with the decorative scheme of the house. Floor lamps without cords are promised. The current will depend on vacuum tules.

A radio-television receiver equipped to re-

mounted in a place specially designed for it in the home of tomorrow. It will have facitities for inscribing sound programs on disc or wire records and for playing them when desired.

Radio programs will come into the home with greater realism. Is a result of the fur ther development of frequency modulation or FVI, sound in its full range and brilliance will flood the atmosphere and no discordant crashes of natural or man made struc will mart the performance Television in full color is promised. The home town parade or the football context a fashion show or dance lesson a popular quiz program or an opera will be seen as well as heard.

I honograph records will be unbreakable. They may be in the form of plastic discs (some of which we now have) or wire. Or they may be steel tapes in which the sound pattern is written magnetically.

The radio will never rest. When the family is about to reture a flip of a switch will trun the radio into a facismile recorder which will sitellity grand away all through the night and in the morning will supply a printed copy of the latest news. In whing that can be put on paper—printed matter writing photographs and cartoons—will be reproduced on the facismile recorder of the home form of the produced on the facismile recorder of the home full sized daily paper but will proposition for the facility and for the facility paper.

Vost of the labor saving devices and many of the mechanisms that are now operated by hand will be more effectively controlled by electronics in the home of tomorrow. Boors in the home of momentow. Boors in the home of momentow Boors in the home and in the garage will open or close automatically on the approach of a person. Many of the ardious or distateful tasks in the home will disappear when the facts known to science today are put to general use in the home of thomorrow.

Ilones Could In the new gyp term called bedi ant beating, hiper placed between the floor of one room and the cell ing of the boom below give an even temperature to both rooms with no het or sold six carriette The Evers and walls are bleak-





Albert Einstein who has charted new paths in science

THE Golden Age of Science is right now Since 1900 discoveries have come so thick and fast that we have room here only to mention some of the most interesting and important ones

In the Meddle Ages every alchemist hoped that he would be the fortune discoverer of the philosopher's stone that had all some thing which was believed to the power to change base metals such as a different or not precious gold As the philosopher's stone did not evist, it remained undiscovered The quest was given up as hopelesowered in the property of the property

About a hundred and forty years ago, John Dalton decided that the atom was the timest particle of matter that could exist and that the atoms of the different elements were essentially different level were estimated to the could one atom be changed into another? Impossible But twentieth-eneutry physicists have done the impossible They have changed one

element mio another! New changed one The story of the modern version of the philosopher's stone beguns in the modifier of the materiesth century with the discovery their an electric current is passed throughout and the passed throughout and the control of the control of the current passed in the curr

# SCIENTISTS of the GOLDEN AGE

By Thomas Gordon Lawrence

We call these particles electrons, and electrons we now know are bits of energued matter in atoms. Thomson found that all electrons are identically the same no matter from what type of atom they come. So now we have something smaller than the atom and this something is the same in all atoms.

Before his death Thomson saw other men go on to do what had been believed for cen turies to be impossible-change one atom into another One of these men was Thom son s own student at Cambridge a young New Zealander Ernest Rutherford (1871 1937) Rutherford became professor of physics at McGill University in Montreal Canada In 1900 he found that the element thorium gave off a gas of its own accord This meant that thorium was breaking up spontaneously But what was the gas and what was left behind? Frederick Soddy (1877 ) a young chemist from Oxford University helped to solve the riddle Ruth erford and Soddy then went to work on ra

In 1900 they announced that as radium broke up it gave off three different kinds of rays (1) positively charged alpha particles (2) negatively charged alpha particles (2) negatively charged beta puricles (electrons) (3) gamma rays which did not consist of particles at all but were similar to light waves only much shorter (Alpha beta and gamma are the first three letters of the Greek alphabet. The names were given to the particles and rays for a quick way of

dium which is far more active than thorium

isigging them) in England in 1907, Rutherford allowed alpha particles to enter a glass chamber from which the particles could not exappe Eram mang the chamber later he found no alpha particles but the found beluing as The ext planatom was that the alpha particles were the found point of the found beluing as the particles were almost a summer of the particles were almost a summer of the particles were almost a summer of the particles were the particles which is the particle with the particle was the particle

that every atom consists of a nucleus having a positive charge and surrounded by nega

tively charged electrons Rutherford reasoned-if all atoms consist of electrons surrounding a nucleus, could be change one atom into another by changing the nucleus? He knew that this takes place in nature in radioactive elements. Could be make this happen to other elements? He needed a bullet that could be shot into the nucleus of an atom But where was there a bullet small enough and powerful enough? The answer was-the tiny alpha particles

themselves, which travel at a speed of more

than 10,000 miles a second In 1919 Rutherford bombarded nitrogen gas with alpha particles from radium rays Some of the nitrogen atoms changed to ovygen! True, in 40,000 cases out of 50 000 the alpha particles sailed right through the ni trogen atoms without disturbing them. But in one case out of 50,000, the alpha particle crashed "just right" into the nitrogen nucleus and stayed there, at the same time knocking a proton from it. Thus the nucleus gained two protons and lost one, making a total gain of one, and changing its atomic number from 7 (nitrogen's number) to 8 (ov) gen's number), but changing its atomic weight from 14 to 17 (The alpha particle contains two neutrons, remember, and a neutron has about the same weight as a proton )

### THE ALCHEMISTS' DREAM-CHANGING ONE ELEMENT TO ANOTHER-COMES TRUE

So, with Rutherford's wonderful expenment nitrogen had been changed to heavy oxygen! One element had been changed to another! What the alchemists had dreamed, Rutherford had accomplished! We have come to think of this operation as "smash ing the atom "

In 1925 the process was actually photographed by a device called the cloud-cham ber In 1910, another Cambridge physicist. C. T. R Wilson, had devised this chamber for the purpose of photographing the paths of ultramicroscopic charged particles, particles too small to be seen under the microscope This is the way it helped Sudden expansion of moist air which filled the chamber caused the temperature to drop and water vapor condensed about any charged particles which happened to be in the cham-ber. The path of these particles could now be photographed, though not, of course, the particles themselves. By the time of Ruther-lord's death in 1937, several atom smashing weapons were available for physicists.

Robert Andrews Millikan (1868 the son of an Illinois preacher, achieved fame by isolating and measuring the electron For this work he received the Nobel Prize in physics in 1021

# THE STRANGE RAYS THAT BOMBARD

OUR EARTH FROM DISTANT SPACE Now Millikan began to investigate certain mysterious rays of which physicists had begun to take note around 1900 Rutherford had found them annoying because of their ability to penetrate thick screens of lead and otherwise upset perfectly planned experi ments Did these rays originate on earth? Millikan sent pilot balloons carrying instru ments as high as ten miles, reaching into the stratosphere. The mysterious rays were stronger the farther from earth the balloon rose They finally were seven or eight times as strong as on earth. Definitely the rays did not originate on the earth. In addition, the rays were shown to be equally strong day or night Evidently the rays did not come from the sun either Were they cosmic in origin? That is did they come from the vast spaces among the stars?

Millikan traveled to the far reaches of the earth to measure these cosmic rays Everywhere he found cosmic rays at the tops of mountains, in valleys, deep below the surface of lakes

Another American scientist Arthur Holly ), came to believe that Compton (1892cosmic rays were really charged particles traveling at terrific speeds

Following the work of J J Thomson and others, it was agreed that the atom, instead of being a tiny solid mass is really mostly space, with a comparatively heavy nucleus in the center and with electrons revolving about the nucleus. The nucleus contains one or more structures called protons, each of which has a positive electric charge and weighs almost 1 850 times as much as an electron Each electron has a negative electric charge. Further details on the structure of the atom are given on page 48

The idea that electrons som around the nucleus was worked out by the Dane, Niels ). Two American scientists Bohr (1885-Irving Langmur (1831-) and Gilbert N Lewis (1875-), continued the study of the structure of the atom

You remember that Mendeleef classified the chemical elements according to their weights. A twenty six year-old I nglishman Henry G J Moseley (1837-1915), made a better arrangement-a table of elements ac-



Thomas Hunt Mergan Sir Ernest Rutherford

cording to atomic number. (Atomic number is the number of electrons in the atom—which is of course equal to the number of protons in its nucleus.) Moseley was killed at Callippin in World War I.

What is mutter? Before the time of Dil ton most people thought that a piece of iron as solid all the way through. The atomic theory indicated that all matter and that the formal through the atomic and that the approximation yacces between the atoms 1.9. Thosoma Rutherford Bohr and the rest showed that the atom itself is mostly space. But what are the electrons and the protons and the other buts within the atom? It ethey my hard

solid bodies? The French scientist Louis victor I rince de Broghe (1802 ) sug gested in 1924 that the electron itself must be thought of not only as being a tiny particle but also as consisting of a group of waves similar to the waves of buth The

waves similar to the waves of light! The Austrian Erwin Schroedinger (1888) and the German Werner Heisenberg (1901) , have developed ideas like those of De

Broghie
In 1913 F W. Aston (one of IJ) Thomson a many brilliant puruls) discovered that in some elements not all of the atoms have the same weight Atoms which do not follow the general rule are called usloper. Aston discovered an isotope of the element neon About 300 stoopes have been found since, incl ding it for tim Uranium has several sisotopes. The famous one is uranium 335.

Ordinary uranium has weight 238
Anotl er famous isotope heavy hydrogen
was discovered by Harold C Urey (1893

was inscovered by Harold C Urey (1893) at Columbia University in 1932 atom of heavy hydrogen has an atomic weight of 2 truce third ordinary hydrogen Water in whose molecules heavy hydrogen takes the place of ordinary hydrogen is called heavy water The heavy hydrogen is called deuterium

Discovery of heavy hydrogen opened type mew feld of research If heavy hydrogen as substituted for ordinary hydrogen in fail and the fals are feld to animals, we can hier find out what happened to the fats in the fail of th

substances
In 1934 Irene and Frédéric Joliot Cune
produced the first artificially made radio
active substances including radioactive ab
uninum an Introgen Thus the Curie famili
continued to pioneer in the work in radio-

activity for Irene is the daughter of Mane and Lierre Curie

Rutherford's work had opened the question of atomic power The force which halds atoms together is tremendous. If only a por tion of this energy could be released for use scientists figured we would no longer worly about using up all our coal and oil supplies, for in atoms we have an inerchaustible supply for in atoms we have an inerchaustible supply around the supplies of the supplies of the supplies reford and his co-work-was refeased. Full when they hit an atomic nucleus with an alpha particle energy was released in large quantities.

# LAWRENCE BUILDS A BIG MACHINE FOR SMASHING LITTLE ATOMS

Finest Orlando Lawrence an American physicisti (1000 ) used a Sorien mag net to which he added another 25 tons of culument to which he added another 25 tons of culument to build an 85 ton machine control of the contr

But more than that uncharged particles called neutrons were knocked out of the nuclea. A neutron is about as heavy as a proton—it is said that a thimble packed with neutron a would weigh a million tons—and strength of the proton—it is not better charge it makes a better builter than an alpha particle Why? Because the electric charge of the alpha particle sometimes proves a nuisire or

The neutron carries no charge (An alpha particle, being positively charged meets

some resistance from nuclei )
For his work with this 85 ton cyclotron
Dr Lawrence was awarded the Nobel Prize
in physics in 1939 By 1940 he had built a
245 ton cyclotron at the University of Cali

Another type of atom smasher is the Van de Graaff generator developed by Robert Van de Graaff of Alabama (1901 ) Bot's the cyclotron and the Van de Graaff Penerator although they work in different

ways are designed to accelerate subatomic particles to great speeds for bombarding atoms

Before World War II started in 1939 it was known that if a heavy atom like that of uranum could be completely broken up enormous amounts of energy would be lib erated. If the atom was even split in two (thus forming two new atoms of lighter chemical elements) the amount of energy released would still be faintsateally great although only a fraction of what would re-

atom

Now when energy is suddenly liberated anything that stands in its way is pushed asside with such violence that we have an explosion. Some explosions are useful as complex of the engine of the responsions are violent explosions are with the violence of the explosions are violent explosions are violent explosions when the top of a volcano blows off or a B 29 drops its loops load.

### THE RACE TO DEVELOP THE WORLD S MOST TERRIBLE WEAPON

There was a fearful race between nean scientists and those of Great Britam Canada and the United States to develop the atomic bomb which gets its titanic power from the smashing of atoms. There is poetic justice in the fact that among the most important scientists on the Allhed side were distinguished exiles driven out of Germany and Idaly by the Assas and Fascillary.

Up to 1930 more work had to be done to smash an atom that was released in the form of energy when the actor was smashed Not in 1939 German physicists including Otto Hahn (1859 ) Fired neutrons at ura mum atoms and scored a bull sey at 4 frest the scientists were not entirely sure of what their results meant but they noticed that the element barrom had appeared (which was not present before) and that enormous quantities of energy had been released The energy production was on a scale far above



Scence Seve Arthur H Compton noted for studies of cosmic rays and Irving Langmair suthority on the structure of atoms They had a part in developing the atomic bomb

anything noted before in atom smashing Lies Meinner (1878 ) and R O Frisch (1904 ), both soon to flee from Ger many because of their Jewish ancestry found the explanation The uranium atom had split into two new atoms one of barrum and one of the rare zas krypton More in

portant was the fact that while the neutron

that but the uranium atom had one thirtieth of a volt of energy the uranium atom shot out 200 000 000 volts—six billion times as much energy as was put into it

Fortunately for civilization two of Europes greatest experts Entirco Fermi who had been extled by Mussolini and Nels Bohr of Denmark, who escaped during nazion occupation were working at Columbia University Dr. Frisch sent the news of the breaking un of uranium to his father in law

As the life-and-death struggle in Europe got under way President Roosevelt saw to it that American and British efforts were pooled Many of the greatest scientists in both countries were involved in the work.

It was Ferm's sides that when the uranum (or other) alone was struck by a neutron and oplit other neutrons would fly out from the broken nucleus Now if these would hit still further atoms and split them a chain re actom would cake place and the final er ploson would be on a gigantic scale It was found that ordinary transum (weight 33) was not suitable but that the rarer uranum 235 was. Before the work was completed two clements never found in nature both her than the summer side of t

you more about the atomic bomb in the story of atomic energy, page 53

So far there is no immediate prospect for any practical use of atomic power except in warfare It has been said that if all the protons and electrons in one drop of water were to destroy each other, enough energy would be evolved to supply 2,400 horse power for a month When atomic power is finally tamed for peaceful use, we may expect a revolution in industry as great as that pro-

duced by steam and electricity During the latter part of the nineteenth century scientists worked out the strange events which take place when the nucleus of the cell divides-the strange dances of the chromosomes called mitosis and reduction division With this knowledge biologists were ready to carry on the work of Mendel when it was re-discovered in 1000. The English biologist William Bateson (1861 1926) and his pupils showed that inheritance of the type described by Mendel takes place in mammals, birds and insects W L Johann sen (1857 1927), the Danish physiologist.

# showed that selection alone would not pro-EXPERIMENTS ON THE TINY FRUIT FLY PROVE NEW IDEAS ABOUT HEREDITY

duce a new type of organism

William E Castle (1867-), of Har vard University, found the ideal creature for experiments in heredity, the fruit fly some times called the vinegar fly The fruit fly grows from egg to adult fly in ten days, lives in perfect health in the laboratory, and has only four pairs of chromosomes Every laboratory in the world where heredity is studsed now has its rows of pint milk bottles

housing hundreds of thousands of fruit flies Thomas Hunt Morgan, famous as the founder of the gene theory, was born in Levington Kentucky, in 1866 the year Men del published his results. In 1909 Morgan studied thousands of fruit flies to see if any of them would show the mutations De Vries had written about In 1010 a mutant whiteesed male fly suddenly appeared in a family of normal red-eyed flies. In the same year Morgan found that his flies produced fifteen mutations, that is, fifteen new types differ-ent from any of their ancestors Soon Morgan gathered a group of devoted students in his laboratories at Columbia University

One of these students, Hermann I Muller (1890 ), produced artificial mutations in fruit flies by bombarding the parent flies with X rays Soon after two other American scientists, L J Stadler and T H Good

speed, artificially produced mutations in plants Man now was not only able to change one chemical element into another, he could also produce new types of organisms in one

generation

Back in 1901 the American scientist C E McClung (1870-) had argued that the sex of grasshoppers was determined by cer tain small chromosomes Morgan's students one of whom was his wife, Lillian V Mor gan, produced abundant evidence to bear out this theory Mrs Morgan helped explain the inheritance of sex linked traits (the fact that women are rarely bald, for example, and the strange cases where a normal mother can transmit hemonbilia, the bleeder's disease, to

her sons, but not to her daughters) Albert T Blake-lee (1874

) of the Carnegie Institution, found that sometimes the chromosomes would fail to divide in a plant, with the result that new types were produced with double the ordinary number of chromosomes The new plants with the extra number of chromosomes turned out to be very different in many cases from their parents Soon it was found that by applying colchicine, a poisonous juice extracted from the autumn crocus, these chromosome doublings could be produced artificially Hence new types of plants could be grown (Of course, the scientist doesn't know in advance what the new type will be )

Thanks to Morgan and his students, in-cluding Alfred H Sturtevant (1891- ), Calvin B Bridges (1889 1938) and T ), we now have "maps" Painter (1880) of the tiny chromosomes of the fruit fly These mans show the exact location of those mysterious structures along the chromosomes which are called genes, and which de termine hereditary characteristics, such as eve color, whether a fly will have wings or not, and other traits

### AR ECLIPSE OF THE SUN TESTS THE THEORY OF RELATIVITY

On May 29, 1919, parties of scientists were gathered in Africa and Brazil, at oppo-site sides of the world Tension was high All the apparatus was ready—the telescopes, the cameras, the spectroscopes Now everything depended on the weather Would it be clear? Or would clouds obscure the total eclipse of

the sun for which they were waiting? At the same time Albert Einstein sat quietly at home in Berlin He had every rea son to be nervous, for these scientific ex peditions were going to test his theory If the eclipse was not obscured by clouds, photographs would be taken which would show once and for all whether Einstein was cor rect in stating that light rays bend as they pass close to a bulk like the sun The photo graphs were taken and Einstein was shown to be correct. He had started a revolution in the world of physics.

Albert Einstein was born at Ulm Ger many, May 14 189 In 1894 Albert went to Zurich, Switzerland where he supported himself by teaching physics and mathemat ace while he studied at the uninersity. He was a rather lonely man and shy He became a Swiss citizen and took a position as patient examiner in Berne He continued his studies at the University of Zurich and got his de

In 1905 Einstein published his Special Theory of Relativity This took, the scien tific world by storm and his reputation was assured In 1913 Berlin created a position for him—director of the Kaiser Withelm I hysical Institute and he was elected to the Royal I russian Academy of Sciences.

gree as a Doctor of Philosophy

In 1915 he published his General Theory of Relativity When his theory was tested by scientists all over the world many honors came to him, molding the Vobel First en physics in 1921 Einstein situliers contain the same facts of our universe—Space time and motion—in exact mathematical figures a thing no scientist hid ever leen able to do For years few minds were able to grasp his problems or to follow his thinking very closely and even today it takes a student of standing of his theories—a clear under

### NEW DOORS TO KNOWLEDGE ARE OPENED BY ALBERT RINSTEIN

Einstein and others have shown that Isaac Newton's Law of Cravisation has certain timy defects when applied to matter in outer Space. These modern scenarists have made suggestions for chinices in Newton's physics. The really, great Inting Einstein has done has been to keep cientists aware of the magnitude of the control of the control

In the days when the Nazis fuled Germany, Albert Finstein was driven from the country and stripped of all his belongings. He made his way to the United States, and from 1933 to 1945 he taught mathematics at Princeton University. He became a naturalized citizen of the United States.



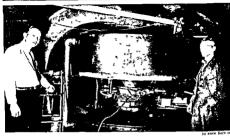
Press \tagoc at on Inc
In their Paris laboratory Irene Curie and her husband
Jean Frédéric jajiot continue the great work of Karie
and Pierre Curie on radioactivity.

One of the most fascinating developments in recent science has been the viduy of hor mones those secretions produced by glands which make people grow tall or short fat or thin active or inactive By means of thyroid extrict the type of idoic called cretin has been made mentally normal while other hormoors have been used actually to change the set of animals—hens into roosters for example

Viore and more we are probing into the secrets of the hung cell On January 17 1912, Dr. Alexis Carrel (1873 1914) a French Scientiv who had come to the United States opened a here seg and cut out a declaration of the Company of the

Almost every day the newspapers carry accounts of new discoveres in the field of drugs and vitamins A wonderful discovery was pencified the developed from a rold which checks the growth of hirmful plants (includ on the buffercup) they in the plants (includ on the buffercup) they in effect and many fungs) produce anisospina which render a similar service.

In the field of chemistry, new materials



The 85-ton cyclotron (or "atom smasher") with its creator Ernest Orlando Lawrence on the left.

such as new plastics rubber like materials synthetic precious stones and new metal al lovs are announced frequently. Among the most marvelous of the recent inventions is the electron microscope which focuses streams of electrons instead of light waves and enables us to make pictures of objects one-fiftieth the size of the smallest thing visible with the best light microscope

We must remember that the findings of science can be used for man's destruction as well as for his benefit. Due to science men no longer die like flies in great epidemics of plague and yellow fever and they need not suffer from many ills which were common only vesterday But science also makes it easier for men to kill each other and to wreck. cities and whole countries with a speed un dreamed of until recently

Science has not been able to make living

things from non living matter The great questions as to the ultimate na ture of matter and energy remain questions and it is here that the language of the sne cialist is probably most difficult for the stu dent to understand When we get to the smallest particles of matter the electron and the proton we find it hard to say just what they are They have what the physicist calls mass and they have electric charges An other fundamental particle the neutron has mass but no electric charge. We used to beheve that matter was very definitely one thing and energy something else-yet now we find the distinction between matter and energy breaking down

In living bodies it has been found that many (perhaps all) life processes are closely tied up with electric charges. All nerve ac tion involves electricity. Hence the doctor can tell an epileptic from a normal person by differences in the electrical waves of the brain Absorption of materials through liv ing cell membranes seems to have some elec trical hasis

In chemistry it has been found that matter is electrical in nature. The electrical nature of atoms accounts for their ability to com bine into molecules Atoms of one element have been transmuted into atoms of differ ent kinds merely by adding or subtracting electrically charged particles in the nucleus as we have seen

Radio waves, light rays ultraviolet rays \ rays, gamma rays are all electromagnetic disturbances differing from each other only in wave-length and frequency of oscillation All this seems to support a oneness about the universe a unity in the natural laws un der which the universe operates. Albert Ein stein expressed this idea in 1905 when he suggested that matter is simply concentrated energy and that energy can be converted into matter and matter into energy

For every discovery and every problem solved new problems foom up Perhaps this is just as well There will always be work for the young scientist to do

# OUTSTANDING 20TH-CENTURY SCIENTISTS

Sir Joseph J Thomson (1856 1940) English Dis covered the nature of cathode rays Made important contributions to electron theory

tant contributions to electron theory

Max Planck (1858 ) German Proposed

quantum theory of energy Won Nobel Prize in

phys cs 1918
Sir William Henry Bragg (1862 ) and his son William Lawrence Bragg (1890-) English Investigated the arrangement of atoms in crystals Joint winners of Nobel Prare in phys

ics 1915 George Washington Carver (1864 1942) Ameri can b ochemist

can b ochemist
Thomas Hunt Morgan (1866 1945) American
Founder of the wrne theory of heredity Won

Nobel Prize in medicine 1933
Theodore William Richards (1868 1928) American Determined the atomic we ghts of chemical elements with great accuracy Won Nobel Prize

in chemistry 1914
Robert Andrews Millikan (1868 ) Ameri
can Measured tharge on the electron Worked
with cosmic rays Won Nobel Prize in physics
1923
C. T. R. Wilson (1869—) Scottish Invented

cloud chamber which makes it poss ble to photo graph the trail of an electron or other sub atomic particle Won Nobel Prize in physics 1927 Ernest Rutherford (1871 1937) New Zealander

Ernest Rutherford (1871 1937) New Zealander Important experiments on nucleus of atom Changed one element into another Won Nobel Prize in chemistry 1908

Walter B Cannon (1871 ) American Studied work of glands and relation between emotions and vital functions

Alexis Carrel (1873 1944) French Kept chicken heart tissue alive for many years Won Vobel Prize in medicine 1912

William D Harkins (1873 ) American Pre d cied the discovery of the neutron Albert F Blakeslee (1874 ) American Ex

perimented on heredity in plants
Charles William Beebe (1877 ) American
Explored undersea hie in bathysphere Authority
on birds

Frederick Soddy (1877 ) Englsh With Rutherford discovered three different kinds of rays given off by radium Won Nobel Prize in chemistry 1911

List Meitner (1878 ) born in Germany Co operated in plitting uranium Albert Einstein (1879 ) born in Germany

now an American citizen His theories have caused a revision of fundamental sdeas about the universe Won Nobel Prize in phys cs 1921.
Otto Hahn (1879 ) born in Germany D scovered (1918 with Lise Mether) radioactive

element protoactinium ik on hobel Prize so them istry 1944 Clinton J Davisson (1881 ) American

Anown for researches in electricity magnetism and redund energy discovered (with L. H. Germer) the diffraction of electrons by crystals (1927) Shared Nobel Prize in physics 1937 SIT Alexander Fleming (1831 ) English Discovered penicil in in 1938 Shared Nobel Prize in

covered penicill n m 1938 Shared Nobel Prize in physiology and medicine 1945 Irving Langmuir (1881 ) American Helped to develop the electron theory it on Nobel Prize

in chemistry 1932

Herbert McLean Evans (1882 ) American Important work with hormones and vitanians Roy Chapman Andrews (1884 ) American Discovered dinocaurs eggs and other fossils

Niels Bohr (1885 ) Danish Worked out a theory of atomic structure Won Nobel Prize in physics 1912 Henry G J Moseley (1887 1915) English Es

tablished table of atomic numbers of elements from the action of Y rays Erwin Schroedinger (1888 ) Austrian De

Veloped the idea that matter may be thought of as consisting of waves. Won Nobel Prize in physics 1043

physics 1933

Hermann J Muller (1890 ) American Produced artificial mutations in fruit fles

James Chadwick (1891 ) English Discovered the neutron Won the Nobel Prize in physics 1935 Prince Louis Victor de Brogle (1891)

French First to state that the electron may consist of waves Won Nobel Prize in physics 1979.
Arthur H. Compton (1892) American Worked with cosmic rays Studied ellects of Years on electrons. Won Nobel Prize in physics.

Worked with cosmic rays Studied ellects of Y rays on electrons Won Nobel Prize in physics 2027 George P Thomson (1892 ) English Son of

Joseph J Thomson Produced evidence to show that electrons behave like waves Shared Nobel Prue in physics 1937 Harold Urey (1801 ) American Investigated

Harold Urey (1893 ) Amer can Invest gated heavy hydrogen and heavy water Woner of Nobel Prize in chemistry 1934 Andrew I Virtanem (1862 ) Finnish Won

Arthuri I Virtanen (1895 ) Finnish Wor Nobel Prize in chemistry 1945 Sir Howard W Florey (1898 ) English

Study of penucil n in 1939 Shared Nobel Prize in physiology and medicine 1945 Isador I Rabi (1898 ) American Made an

estimate of the dameter of the neutron Won Nobel Prize in physics 1944 Jean Fredéric Jol of (1900 ) and Irene Curie (1897 ) French Artifically produced

radioactive elements Joint winners of Nobel Prize in chemistry 1935 Wolfgang Pauli (1900 ) born in Austria

Won Nobel Prize in physics 1945
Werner Heisenberg (1901 ) German D s
covered the principle of uncertainty." This

means that are the can not know both the exact velocity and the exact postion of an electron at the same time Won Nobel Prize in physics 1932 Ernest O Lawrence (1901 ) American De veloped the cyclotron the atom smasher Win

ner of Nobel Prize in physics 1939

Enrico Ferms (1901 ) Italian Important
work in development of atomic bomb

Wendell M Stanley (1904 ) American D scovered that certain disease-causing viruses are actually crystalline proteins
J Robert Oppenheumer (1904 ) America

Directed alomn bomb research in New Mexico

Carl D Anderson (1905 ) American D scov

ered the positron (or positive electron) a par

ticle of the same mass as the electron but with

a positive electric charge, Wan Nobel Prize in

a pos tive electric charge. Wan Nobel Pr ze un physica 1936 Ernat Boria Chain (1906—) born in German Herelopment of pen c il n Shared Nobel Prize in

physiology and med class 1945



# By Samuel Guy Inman

BRAZII is n t nly the largest country largest country mercua, the is the f urth largest country in the wild II you in ag ne an area the size of the United States with you will have a good idea of the size of Brazi!

To the people whele in the in mense territory events of great importance came crowding thick and fast cleafter another

all dur ny 1945

To begin with Brazil was going all she hal to deleat Germini There was no time for illeness at the ar bases on the log Brazilian files, the nearest point of the mail South America Brazilian I fund these bases to the United States to bottom the air distance across the Vilinic.

In Brazil's easters cities along the sait fact ties were working full that I war production. Inhand along the Amazon Valenthousants if workers were struggling to in

crease the production of desperately needed rubber

While Brazil was helping to win the war her people were being ruled by a dictatorial government and they were restless Before the year was over revolution broke out in

Brazil as you shall see

In spite of discontent at home, Brazil co-operated with the United States in many important ways No ally could have been more staunch Brazil was one of the members of the Mexico City Conference and gave her approval to the famous Act of Chapultenec which you may read about in the article on Mexico in this ANNUAL

# BRAZIL JOINS IN THE WAR AGAINST JAPAN AND RATIFIES THE UNITED NATIONS CHARTER

Brazil declared war on Japan on June 6 1945 This was welcome news to the United Nations for at that time it looked as if the war in the Pacific was going to be long and very diff cult

Later in the year Brazil took part in the San Francisco Conference She ratified the Charter of the United Nations on Septem

ber 8 In all of Brazil's history there has never been anything like the progress she has made in recent years The man who led Brazil in this swift growth is Getulio Vargas He has done more for the economic develop-

ment of his country than has any other ruler Vargas was president of Brazil But he exercised the powers of a dictator With the end of the war Vargas was nearing the end of his long years of rule He had seized power in Brazil in 1030, and for fifteen years he had given the people no chance to elect another president Now most of the people and a large part of the army were clamoring for the right to choose the r own president in a free election

# DICTATOR VARGAS IS FORCED TO RESIGN AND GENERAL DUTRA IS ELECTED PRESIDENT

Vargas promised to give Brazilians what they wanted All through 1945 he had held out the hope of an election He even set the date for December 2 But the general feel ing was very strong that a man who had been so long in off ce would want to continue

Late in October the army forced Vargas to res gn In accordance with the Brazilian Constitution the Chief Justice of the Su preme Court would act as president until an election could be held And so Chief Justice Jose Linhares was sworn in as Brazil's tem porary president The United States officially

recognized the Linhares Government on No vember 2

Jose Linhares carried out the promise that Vargas had made A presidential election was held on December 2 Seven million five hun dred thousand persons registered for this election General Enrico Gaspar Dutra was elected the president of Braz | Getul o Var gas was elected senator for h s state

# HOW THE WAR BROUGHT THE NORTH AND SOUTH AMERICAN REPUBLICS TOGETHER IN ACTION

One of the finest results of the war is the new spirit of co-operation between most of the republics of North and South America Brazil shows us many outstanding examples of this spirit. One instance of the friendship between Brazil and the United States is the story of an old ship which was sent on an important mission

On November 10 1945 an old naval transport steamed into New York Harbor Her name was the Duque de Caxias and she was flying the Brazilian flag Six months earlier she had been called the Orizaba and

she flew the Stars and Stripes

Travelers well remember the old Orizaba in the days before the war when they en joyed many happy voyages aboard. The United States had turned the Orizaba over to the Brazilian Government in July Re christened the Duque de Caxias her business was now more serious. She would sail home carrying the last of the several hundred Bra zılıan veterans who had been wounded in the Italian campaigns and who had then been sent to the United States to recover

# UNITED STATES AND BRAZILIAN SOLDIERS HAD FOUGHT SIDE BY SIDE IN WINNING ITALY

Earlier in the year on July 18 Rio de Janeiro Brazil's great capital had welcomed the return of other veterans of the Italian campaigns These were some of the troops of the Brazilian Expeditionary Force What a tremendous burst of joy greeted them as they poured down the gangplanks! They were given a wonderful ovation and as a mark of the good will between their country and the Un ted States they were reviewed by a United States general who had just come from Italy himself.—General Mark W. Clark

In the long gram struggle in Italy the men from Brazil and the men from the United States had come to know each other well They ga ned new respect for each other and new friendships were formed that will help both countries to understand each other

better now that the war is over



Bratilian soldiers leaving the docks at Rio de Janeiro The Bratilian Expeditionary Force joined with the ether Allied forces in driving the Germans out of Italy They were given a tremendous reception upon arriving home

This war marked the first time that Bra zihan soldiers ever fought on European soil They fought under North American generals and used guns and tanks made in North America

One of the most important projects that Brazil undertook was her effort to grow rubber in the Amazon Valley Rubber is vital in war and there was a desperate short age of the natural product because the Japa nese had seized the great rubber plantations of Java and Malava Brazil and the United States speeded up the production of rubber in the Amazon Valley The Brazilian Gov ernment sent thousands of workers there Immediately their health became a problem Fevers and heat make the Amazon jungles dangerous to people who are not used to living in that region The United States sent many doctors and nurses to guard the health of the rubber workers

The Amazon Valley may become more and more important in the future. It is quite possible that it will become one of the rub ber centers of the world. And it may become the home of many of the homeless refugees.

of Europe
Brazil's great West is as untouched as the
western part of the United States used to be
a century ago Stretching far inland the
Amazon Valley is one of the largest and
richest undeveloped areas on earth Millions
of refugers could settle there with room to

spare and build themselves new homes and find new hope for laving One difficulty is that it would cost a great deal of money is make the valley a good place for them to live Science would have to tackle the prob lem of saintation Great quantities of food would have to be raised and modern farm machinery would have to be introduced.

Modern industry is already thriving in the cooler region along the eastern coast Sao Paulo is a great industrial city—the second largest city in Brazil and the third largest in South America With a population of about 1 500 000, Sao Paulo claims to be

the most rapidly growing city in the world.
On the road between Sao Paulo and Rio
de Janeiro lies Volta Redonda with its new
steel mill. For the first t me in their lives
thousands of workers in this mill are living
in modern homes and sending their children
to school.

Every great war is followed by new and difficult problems. After World War II many countries were faced with the same problems that twobled Brand Laving costs of the same problems that two the same problems that the same problems are same problems. Brand is same problems for a better economic life. Brand has been plants for a better economic life. Her laborers needed better houses More schools were needed too as well as per kinds of schools have needed too as well as per kinds of schools that would make medera more Brandians.

But Brazil's greatest need was for a democratic government and you have read how she solved this problem What happened in Brazil with the coming of peace happened also in many other parts of the world People who had been denied the right to vote and to express their opinions demanded these rights In South America there was a grow ing shift away from dictatorship toward democracy There were two more revolutions in South America in 1045-one in Venezuela that succeeded and one in Argentina that failed

The revolution in Venezuela took place in October The president of Venezuela was Isaías Medina Angarita On October 19 some of the officers of the army revolted against President Medina and forced him out

of office

Caracas the capital was thrown into a turmoil Part of the army remained loyal to Medina and there was fighting between the two groups with riots and looting and bloodshed Romulo Betancourt succeeded Medina as president, but he had to win his position and hold it by the armed strength of his supporters. He was confident of vic tory The next day-October 20-Betan court assured the United States Embassy that he would soon restore peace and order On October 21 several other army garrisons joined Betancourt's rebel forces and Medina and members of Medina's cabinet were

in tustody Betancourt had triumphed As provisional president Betancourt zuela until an election could be held. He promised to help his country establish a democratic government. He also promised that delegates would be elected to draw up a new constitution, and he promised to hold a presidential election as soon as possible

enezuela has always been governed by a few people who seemed not to be concerned with the country's welfare. One of its most famous dictators was Juan Vicente Gómez who died in 1935 Since his death two of his Venezuela-General Lopez generals ruled Contreras and General Medina

For years Venezuela has depended for most of her income on her oil and her big ranches The Betancourt Government has appointed a commission to see what can be done to give Venezuela other sources of in come It is hoped that the development of manufacturing and of various kinds of small

business may be the answer

Venezuela is made up of small states loosely linked with the central government The Betarcourt Government appointed a commission to study ways for the Govern ment and the states to work more closely together in order to improve the health of the people to give them a better education and to build up a prosperous business life

from which all would benefit

The revolution in Argentina did not end on such a hopeful note The government of Argentina is still a dictatorship

Argentina has long been South America's problem child During the war Argentina



James Sawders

very last moment. Argentina did not declare war on Germany until March 27 1945 when Allied victory in Germany was a certainty The German surrender was only a little more than a month away Argentina also declared

war on Japan on March 27 When rebellion broke out in Argentina in October there was hope for a little while that a democratic government might take the place of Argentina's dictatorship This

hope was short lived Juan D Perón was the dictator of Argen tina. His title was vice president, but he had more power than the president Edelmiro Farrell because he was able to make Farrell

obey his orders

Perón ruled his country with methods very much like those of Hitler and the Nazis Peron was in control of the police who had been trained in the use of machine guns and other deadly weapons. Some of the labor umons and a large part of the army also supported Perón Many of the common people, however longed to overthrow him

There had been many demonstrations against this dictator One of the largest demonstrations took place on September 10 in Buenos Aires the capital It was estimated that 500 000 people took part. They carried shouted 1 sta la Democracia"-Long Live Democracy

Perón s military government arrested many of the demonstrators. There followed a reign of terror In protest more than 30, 000 university students went on a nation wide strike on October 3 Many students were arrested Riots took place which the police put down by firmy into the crowds The Government even occupied the six na tional universities of Argentina

Doctors lawvers and other professional and business groups joined the demonstra tion on the side of the students and of de mocracy Finally on October 9, 1 erón resigned

But the leaders of freedom were slow to act and they were not so highly organized as the supporters of Peron The dictator ral lied his forces round him and headed a counter revolution On October 17 Perón was back in power. He did not take a government office but he was still the Strong Man of Argentina controlling President Farrell and the country

A presidential election was scheduled to be held on February 24, 1946 Peron an nounced that he would run for the presi dency

banners They sang songs of freedom They Other countries were troubled about Ar genting They did not know how they should treat this dictator country. The difficulty of scene in Colombia Steve making the right choice has caused the lrug quinine is made CIAA phote

United States and other American republics to change their attitude exeral tim s. Ar gentina was not present at the Inter American Conference in Vesico City in the early part of the vera But she was taken back into the Pan American family of nations after she had declared war on the Avs. and signed the Act of Chapultepec

### ARGENTINA IS ONE OF THE UNITED NATIONS BUT HAS STILL REMAINED A DICTATORSHIP

Argentina asked to be invited to the United Nations Conference at Sun Eranseco. The United States and Latin America voted to invite he because they boped at would help to bring constitutional government brick to Argentina. This hope was not fulfilled Although Argentina ratified the United Nations Charter (Explember 8) she was still a dividing force among the countries of the Americas at the end of the year.

In striking contrast to Argentina I eru swung to the left in 1945 The July elections for president were won by the I iberal and leftist candidate, Jose Luis Bustamante Rivern

Peru was the home of aristocracy during colonial days when Spanish grandees ruled the land. When the country won its independence, it did not become a democracy but a republic in which a few men had all the say.

Some twenty years ago a group of students led by a brillant young man named Hava de la Torre decuded to start a movement to change Peru mto a democracy. They were of course vigorously opposed by the Govern ment and some of them were eviled. Other tectorn parties jouned this movement and after many years they finally won the victory for which they had struzgled.

### A LONG STRUGGLE FOR DEMOCRACY IN PERU IS FINALLY RESULTING IN GREATER FREEDOM

The press was granted freedom of expres son Labor was allowed to organize teachers could express their opinions freely and the Autonal Congress was allowed full liberty of debate

When Haya de la Torr who had been living underground, addressed a huge crowd in Lina the Perusian capital, he said. We do not want bread without liberty or liberty without bread.

It is to be hoped that Peru will be able to achieve both bread and liberty. But she has a long way to go before those who have been deprised of freedom of expression can truly understand what liberty means. They



Vibs del Mar Chile's most fashionable seasife resort,
will need to learn that discipline and a re
spect for the rights of others are a part of

freedom in a democracy

I eru declared nar on Germany and Japan

on February 12 Two days later along with

Paraguay Lhile and Ecuador she became a

member of the United Nations Peru ratified

the Linted Nations Charter on October 15

As the year drew to a close two countries—Peru and Venzeuela—seemed to have been added to the democracies in South and Central America. These include Uruguav Chile Colombia Mexico, Cuba and Costa Rica Turning in the direction of democracy were Guatemala El Salvador and Ecuador

On the side of dictatorship were Argen tina Paraguay, Bolivia the Dominican Re public Haiti Honduras and Nicaragua

It was clear that throughout Latin America the common people had been so stirred by the war that any dictator might lose his job overnight

We should remember that much of South America has been related from world affairs for a long time Now however this relation is changing New schools are being built More and more people are learning to read and write New books are pouring from the printing oresess

Communication among the different coun

# PIRUS COUSIN OF THE CAMELS



Pan Anc. on A Corr.

Chief beast of borden in Force in the plains. It has been in use since the days of the locus and the Span area.

[ 280 ]

tries and between North and South America is improving rapidly. The Pan American Highway and new airplane routes are being pushed More and more visitors are coming in from other countries. The new organiza tion of labor and the improvement of the health of the people are also very important changes

It has been said that one test of civiliza tion is the way a nation treats its children If you believe that this is true you will be interested in what Chile is doing for some of

its children

Santiago, the capital of Chile, is building a Children's City in one of its suburbs It will consist of about thirty buildings for orphans and forsaken children The build ings will be named after American republics and heroes There will also be schools a

hospital, a library and a theater Boys and girls in North and South Amer ica can do a great deal to further Inter American friendship Many schools might like to follow some of the suggestions that were made in the distant land of Chile These suggestions were recently made by Chile's Minister of Education He put them in a bulletin that he sent to all the pupils of the public schools in that country. Here they WAYS IN WHICH SCHOOL BOYS AND GIRLS CAN HELP TO BUILD INTER AMERICAN FRIENDSHIP

Read about the life of some notable citi zen of each American country

Celebrate the independence day of each

republic.

1 Try to understand the life of these coun tries especially through their music dances and legends Study the history and geography of each

country Read the papers for news of these repub hes and send a note of sympathy when a national catastrophe overtakes one of them

6 Study the work of such organizations as the Pan American Union, the Rockefeller Foundation and the Red Cross, and the

things they do to help the peoples of the Americas understand each other Form I'an American clubs in your schools Exchange letters, student publications

and photographs with students in other countries o Keep a map of the American continent

close to your school flag A program such as this carried out by a

number of schools in American countries would be a powerful influence for good are

emocratic patriots in Buenos Aires Argentina, recently ataged a big parade called the Earch of Constitution of Liberty. The photograph above a crowd of young color guards leading marchers to the Plaza del Congress

# SPORTS REVIEW

By Leo Waldman

Courtesy of A G Spilding & Bros, Inc

BASERALL once usan turned out to be the purce de résistance on the 1945 varned sports calendar floth the uncertaint and Automa Baesball leagues und unterchi and a single facer to be forgot en pennant races in their respective circuits—frondably the most closely contested and dramatic battle ever staged bu our rational pattiem—with the Detroit Tigers and the Chargoo Cube hope of the pennant race of the contested and the contested and the stage of the contested and the conteste

Detroit staving off a late challenge by the surging Washington Senators clinched the American League pennant on the final day of the season when Hain. Greenberg who re counted the train in multisum net after being. Forces as a captain hit a home run with the bases full in the ninth imming against the St. Louis Browns to give his train the neces sary triumph by a 6 to 3 score. This certainly meant turning the table— because these same Browners needed out the Tigers the 104 startmany.

the 1942 campaign.
The Cubs don't make their followers sufThe Cubs don't make their following day.
They wrapped up then hathoral League
promain on the next to final day of the sea
son beating the Pittsburgh Pirates in a
doubleheader The tian victory cut short the
St Lous Cardinals ambitonts of winting
their fourth successive flag Billy South
worth's team had won the busting in 1942
1943 and 1944 and the manager just missed
equaling the record of lour cansecutive pen
and for WiCardin-Viceld by John Soferia.

This was the seventh American League pennant won by a Detroit team but the first for Steve O'Neill as manager He finally achieved his ambition after fifteen years of managing teams at Toronto Toledo Cleve land. Buffalo. Beaumont and finally Detroit



O Neill however was the No 1 catcher of the Cleveland team which won the American League pennant and beat Brooklyn in the World Series of 1920

Detroit was far from the greatest team ever to wan a pennut. Most of the club stars like those of other teams were on leav string with the armed forces but O'Neil put together a veteran combination with the available miteral and at turned out to be the best in the loop. It was one of the oldest pennant waning aggregations, the team averaged well over thurty vears of age. Decramer the centrefielder Paul Rehards first stimut catcher. Hank Greenbeat there thanks the properties of build be the properties of the properties of the probined bustle opportunism and skill to come out on too.

Despute the last that he had been in the Air Forces for four years serving in Idol China and the Pacific Greenberg was just as good as ever when he reponed the Tigers And has bug but was the deed in glactor in the permant race. It was this company of the permant race it was the permant race in the second of the permant race in the permant race in the permant race when the permant race is the permant race in the permanent race in

Hal Newhouser Paul (Dizzy) Trout and Alton Benton were the pitching standouts for O Nell's forces Newhouser twenty four year-old southpaw, won twenty five games tops in both major leagues Trout despite the fact that he was bothered by a sore arm won eighteen Benton came up with thurteen conquests Detroit took over first place on June 12 Washington moved within a half game of first place on four different occasions but one or another of these three viar pitchers came through with a stellar performance to keep the team on top of the standings.

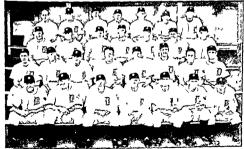
In capturing the National League flag its susteenth since 1876 the Chicago team established a new record for most pennants won it had previously been tied with the New lork Gantis each with fifteen Jolly Charley Grumm managed the Cubs in their winning forms managed the Cubs in their winning the fourth of the contract of the same of the same

The Cardinals and Brooklyn Dodgers gave the Chacgo team a tough run for the big prize during the season but the Cubs had an outstanding pitching staff hurlers who were at their best when the pressure was on and this advantage proved the difference. There was Hank Wise consistent all the season and owner of teemly two translations and owner of teemly two translations and owner of teemly two translations. The season turned out to be a bareain purchase season turned out to be a bareain purchase

winning eleven games and losing only two And three old timers. Claude Passeau. Paul Derringir and Ray. Prin taught the young opposing batsmen a few tricks and they turned in a combined total of forty six conduests.

Phil Cavarretta like Greenberg with the Detroit team was the big gun in Chicago's attack. This shok fielding first baseman wielded the most potent bat in the major leagues capturing the National League bat ting crown with an average of 355-par ticularly outstanding when compared to the 300 which won the American League honors for Ceorge Sturnweiss, second baseman for the New York Yankees Ably assisting Cavar retta in banging out hits were Andy Lafko Leanuts Lowrey Bill (Swish) Nicholson Stan Hack and Don Johnson These fence busters helped the Cubs sweep twenty doublehenders during the season-an advan tage which went a long way in deciding the race

The two pennant winners came together in the forty second World Series classic and again they staged a thrilling show They fought hammer and tongs right up to the seventh and final game but Detroit boasted the best pitcher in baseball in Newhouser and he proved to be the difference as the Theory win the series four game sto three



Besedail a world champions for 1945, the Detroit Tigers won their trown by beating out the Washington Senato for the American League pennant, and then whipping the Chicago Cube of the National League in the World Series

The final standings of the teams in both the American and National leagues as reprinted in Spalding's Baseball Guide follow American League

| TEAM         | w             | L              | PCT |
|--------------|---------------|----------------|-----|
| Detroit      | 88            | 65             | 575 |
| Washington   | 87            | 67             | 565 |
| St Louis     | 81            | 70             | 336 |
| New York     |               | 71             | 533 |
| Cleveland    | 73            | 72<br>78<br>83 | 593 |
| Chicago      | 71            | 78             | 47  |
| Boston       | 71            | 83             | 461 |
| Philadelphia | 52            | 98             | 347 |
| Va.          | t onal League |                |     |
| Chicago      | φ8            | 56             | 636 |
| St Louis     |               |                | 617 |
| Brooklyn     | 95<br>87      | 59<br>67       | 563 |
| Pittsburgh   | 82            | 72             | 532 |
| New York     | 78<br>67      | 74             | 513 |
| Boston       | 67            | 74<br>85<br>93 | 441 |
| Cincinnati   | 61            | 93             | 396 |

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Philadelphia Chicago won the opening game with Bor owy hurling a o to o shutout but the Tigers evened it up when Virgil Trucks fresh out of the Navy turned back the Windy City nine 4 to 1 in the second game Passeau turned in the best game ever pitched in a World Series holding the Tigers to one hit for a 3 to-o triumph and again giving Chi cago a one-game lead Trout put Detroit back on even terms with a 4 to 1 victory in the fourth clash And then Detroit took the lead for the first time in the series when New houser coasted to an 8 to-4 conquest. The irrepressible Cubs fought back and evened the series at three games all with a dramatic twelve inning 8 to-7 victory. But in the de ciding game Newhouser had the stuff to hold the Cubs at bay while the Detroit sluggers paced by Greenberg and Richards banged out a o-to-3 triumph for the world's cham nionship It was Detroit's second World Series

championship and it had scored its only previous one over another Chicago team in 1035 Cramer led the Detroit batters with a percentage of 379 but Greenberg was the big slugger, socking two home runs and bat ting in seven tallies Cavarretta paced both teams in bitting with a mark of .323 but he received little support from his Chicago team motes Richards was the hero of the most important victory the final game when his two crashing doubles knocked four runs across the plate This was Chicago s seventh straight World Series defeat since their last championship back in 1008

It was the richest Borld Series ever played A total record crowd of 333,457 for

the seven games boosted the final receipts to a new high of \$1 502,454 It was the fif teenth St 000 000 series in forty two years The previous record for receipts was \$1 122 328 compiled when the Tigers and Cincin nati Reds met in 1940 Each Detroit player received a winning share of \$6,445 while each Chicago player earned the smaller slice of \$3 070

The score by mnings of the seven World Pet

| Series games follo   | ns.    |         |         |      |     |     |
|----------------------|--------|---------|---------|------|-----|-----|
|                      |        |         | "       | L    | Po  | CŤ. |
| Detro t (A L)        |        |         | 4       | 3    | 3   | 71  |
| Chicago (N. L.)      |        |         |         | 4    |     | 29  |
| First game at Detr   | ost—   |         |         | R :  | н   | F   |
| Chrago (N.L.)        | 401    | 000     | 200-    | 0    | 13  | ٥   |
| Detro t (\ L)        | 000    | 000     | 000-    | •    | 6   | ٥   |
| Batter es-Borowy     | and I  | IVINES  | ton No  | wh   | ous | er  |
| Benton (3) Tob n (5) | Muelle | r (8) a | od Rich | ards | L.  |     |
| Second game at De    |        |         |         | R. : | н   | E.  |
| Chicago (N L)        |        | 100     | 000-    | r.   | 7   | ٥   |

Detroit (A. L.) Batteries-Wyse Er ckson (7) and Gillesp e Trucks and Richards

Th rd game at Detroit-R. HE Chearn (N. L.) 000 200 100-1 Detroit (A L ) 000 000 000-0 Batteries-Passeau and Livingston Overmure Benton (7) and Swift Richards (2) RHE Fourth game at Chicago-

Detro t (4 L) 000 400 000-4 Chicago (A I ) Dermoger (4) Vandenberg (6) Frekun (8) and Laungston



F (th game at Chicago— R H E Detrott (A L ) oor oo4 102-8 11 o Chicago (N L ) ool oo2 201-4 7 2 Eatternes—Newhouser and Richards Borowy

Vandenberg (6) Chipman (6) Derringer (7) Erick son (6) and Livingston

Suth game at Chicago— R II F
Detroit (A. L.) 010 000 240 000—7 13 2
Chicago (N L.) 000 041 200 001—8 15 3
Batteries—Truck Caster (5) Bridges (6) Beaton
(5) Trout (8) and Richards Swift (6) Passeau

(2) Trout (8) and Richards Swift (6) Passeau Wyse (7), Prim (8) Boro vy (9) and Livingston Wilbams (re)

Seventh game at Chicago— R. H. E.

Cheago (R. L.) 510 000 120—9 9 1 Cheago (R. L.) 100 100 110—3 10 0 Batternes—Newhouser and Richards Swift (8) Browny Derringer (1) Vandenberg (2) Erickson (6) Passeau (8) Wyse (9) and Livingston

The owners of the sixteen major league teams apponded a new high commissioner of basehall Senator Alhert B (Happy) Chan diler, on April 32, to succeed the late Judge Kenesaw Mountain Landis who had ruled the game since the establishment of the commissioners office back in 1920 Chandler forty six years old had been governor of Aentucky twice and a member of the United States Senate for two terms The new boss of basehall was born in Versaulles Lentucky, obtained his college degree at Transiy Nama and his legal education at Harvard He respond from the Senate in November to die

Presiden Harry S Truman bonored base ball by taking in the Washington St Louis game at Gmith Sadaum in the Capital on September 8 He was the first president to the second of the second

There was one no hit game during the season and it was pitched by Dick Fowler between your old righthander for the Philadelphia Athlelius who was making his starting appea ance after being discharged from the Canadian Army The one of the property of the property of the property of the Browns 1 to 0 on Speniose of a Shibe Park Philadelphia League since 1940 when Bob Feller of Cleveland blanked the White Sox on the opening day of the season Fowler struck out six, walked four and faced only twenty une balsmen.

The year's Most Valuable Player title was awarded in the National League to Phil Cav aretta star first baseman of the pennant win ning Chicago Cubs In the American League Hal Newhouser, ace lefthanded hurler of the



Thotograph by Bert Morgin courtesy The R der and The Photograph by Bert Morgin courtesy The R der and The Photograph by Bert Morgin courtesy The R der and The Photograph by Bert Morgin courtesy The R der and The Photograph by Bert Morgin courtesy The R der and The

world's champion Detroit Tigers, won the honor for the second year in a row

After the season's close the Boston Braves announced that they had signed Billy South worth as their 1946 manager Southworth who had led the St. Lous Cardinals to three straight pennants, parted amicably with Card president Sam Bradon in returning to Beantown where he once played as an out fielder. The Card nals reported that their new manager would be Eddie Dyer former direction of the St. Lous farm clubs.

More fans watched major league baseball in 1945 than ever before Five teams passed the milhon mark in paid admissions. Detroit Chicago Cubs New York Vankees New York Chants and Brooklyn and the overall total for the streen clubs soared to the retord high of 11375 185. The previous record was 10 381 891 made in 1940 Detroit had the largest individual 1945 bigh with 1380 321.

### MOST OF BOXINGS CHAMPIONS SERVED IN THE ARMED FORCES DURING THE WAR

Boxing made a tremendous contribution to the war effort during the last year \ir tually every divisional champ on served in some branch of the service Joe Louis the heavyweight king was a technical sergeant in the Army Gus Lesnevich the light heavy weight boss Tony Zale middleweight king and Freddy (Red) Cochrane the welter weight ruler all served in Uncle Sam's Navy Bob Montgomery the lightweight title hold er New York version wore an Army uni form Willie Pep and Sal Bartolo co holders of the featherweight crown the former rec ognized in New York and Connecticut and the latter by the National Boxing Associa tion served in the Army and Merchant Ma rine respectively Manuel Ortiz the bantam weight kingpin also served in the Army and Peter kane flyweight title holder from Eng land served in the British armed forces Only Ike Williams who is recognized as lightweight champ on by the N BA, was not able to serve in the armed forces because of a physical handican

Louis whose real name is Joseph L. Bar row was awarded the Legon of Ment for exceptionally meritorious conduct in the performance of outstanding services travel ing in European Mediterranean and North Mrican theaters and volunteering his serv ices at considerable risk to his boying future as heavyweight champion of the world

Louis and his chief heavyweight rival Billy Conn were both discharged from the Army an September and immediately plans were put into operation to bring the behe moths together in another big light prob ably some time during the summer of 1940 It will be recalled that Louis successfully de iended his crown against Com a few years ago by knocking out the good looking Pitts burgh battler in the thirteenth round. The ting records of both of these performers are listed in Spalding's Boxing Guide Louis now that yone years of age had been in the Army since January, 1942 and had enter Lained more than 2 500 000 men with eithir toon bouts earning two battle stars in addition bouts earning two battle stars in addition.

tion to the Legion of Merit medal Red Cochrane the welterweight champs

on was discharged from the Navy, as a the petty officer and he immediately started training for another title—but this one was for a flacehor of Science degree in physical education. The thirty year-old setteran from the petty of the petty of the started of the petty of the pet

Pep had a distinctive honor. He served in both the havy and the Army—the only na tonally known athlete to serve in both branches of the service. He was inducted into the Navy earls in 1944 but was off the honor of the honor of

### IKE WILLIAMS CAPTURES THE LIGHTWEIGHT CROWN FROM JUAN ZURITA IN MEXICO CITY

Besides the Pep Terranova title bout there was only one other championsh p fight during the year Ike Williams, a resident of Trenton New Jersey won the N B 4 [ght weight crown from Juan Zurita of Mexico via a third round knockout no April 18 be fore a capacity crowd in Mexico City Williams however, will neare he classifed as a great champion In four meetings with Wille Joyce of Cary, Indians, Williams host three

times the last on June 8 at Madison Square Garden—all non title affairs

One of the hardest hitters are the eloped among the smaller fighters came up from the ranks. He was from the following the smaller fighters came up from the ranks. He was for from Brooksh of only a first of the smaller fighter a year ago the first of the fighter a year ago the first of the fighter a year ago the first of the fir

England crowned a new heavyweight champion for Great Britan and the British less when Bruce Woodcock knocked out the veteran defending title holder Jack London in the sixth round Woodcock only twenty four eight years younger than London kept his record unblemished with his twenteth consecutive victory inneteen of them re

corded by knockouts
The bg news in the track and field world
was furnished by Gunder (the Wunder)
Hagg Sweden shaberdashery saleman and
probably the greatest distance rained the Many of the Many of

that he will do a mile in four minutes before he retires from running

Following is a brief summary of some of the mile records through the years as I sted in Spalding's Track, and Field Guide

| n Spald | ings Track and I ield Guide | Time   |
|---------|-----------------------------|--------|
| EAR     | ATRIETE A D CO VIAL         |        |
|         | Webster England             | 4 44 3 |
| 355     | George Fng and              | 4 88   |
| 88 s    | Iones Un ted States         | 4 4    |
| Q13     | Jones On red Strices        | 1 20   |
| 015     | Taber Un ted 5 ates         | 1 01   |
| 923     | Nurtn I nland               | 4 00 8 |
| 1031    | Lo loumegue France          | 1 06   |
|         | Count neham. Un teo States  | 96     |
| 1934    | Wooderson England           | 130    |
| 1937    | Hagg Sweden                 |        |
| 1942    | Hagg Sweden                 | 4 4    |
|         | Hagg S eden                 | 10     |
| 1043    | Andersson Sweden            | 40     |
| 1945    | Hagg S eden                 |        |
|         | Tracks of the Jan           |        |

The New York Athletic Club dom nated the 1945 outdoor competition. The Viniged Foot retained the national A A L. senor title with 74 points at Randall's Island New Ork with the Yew York Pioneer Club sec ond with 48 tallies And the Viniged Foot also won the national jumor team bonors with 59 points. The I soneer Club was agan second with 50 points.

Roland Sink 'nineteen year-old youngster from Los Angeles was the big surprise of the outdoor nationals by capturing the coveted 1 500 meter crown in what may be the be ginning of a long regin as American Sink Beat Tominy Quino of the New York Ale to the year of the the was not particularly fast but the 100 degree temperature spoiled any chances for record performances

The United States Naval Academy came up with the best outdoor track and field squad in the colleg ate ranks and the Mid



of Pennsyl an a

ron in the snout Penn Relay Carni yal at Philadelphia des retained their Intercollegate AAA AG undoor team champonship with 85½ points—a record total—and also won the Autonal Collegate AA cross with 65 Autonal Collegate AA cross with 65 Autonal Collegate AA cross with 65 Autonal Collegate AB Collegate AB

#### FORMER FORDHAM MILER JIM RAFFERTY WINS TEN STRAIGHT RACES ON INDOOR TRACES

Jim Raffert), thenty mue years old and a graduate from Fordham eight years own as the big star of the discovery and a graduate from the startest mile has a 10.9 was the big star of the startest mile has a 10.9 with Rafferty, and accountant dime as 4 10.9 with Rafferty, and accountant dime to the startest mile has a 10.0 with Rafferty and accountant dime to more different markets and the startest mile has a 10.0 with Rafferty and accountant dime to min Gold best Dodds, the 1944 champion gase up the min grouped group He had studied for the minestry at the Boston Theological School

ministry at the Boston Theological School Hagg and his countryman Haakon Lid man visited the Ln ted States during the moor season but neither was very successful Hagg lost all of his four races and constantly complained that the American indoor banked tracks were not suitable for his type of run mig. Lidman, a hurdler won a few races.

but an impured lane hampered his training. Sergeant Frank Parker retained his top ranking as the country soutstanding tenus player. The sergeant statuoned in the Pa player the sergeant statuoned in the Pa fended his national sample screening the form of the part of the

Pauline Betz of Los Angeles winner of the women's national singles championship in 1942 1943 and 1944 lost the chance of equaling Helen Hull Jacobs feat of winning four consecutive tutles by succumbing to Mrs Sarah Palirey Cooke, of Boston 36 8 6 6 4 Mrs Cooke wife of Elwood Cooke also one of the country is top players before joining the Navy had retired from competition after maning the crown in 1941 and she celebrated her return to the sport by gar nering her second championship

While Miss Betz failed in seeking her fourth title Louise Brough and Miss Os borne succeeded This combine teamed per fectly and won the women's doubles title for the fourth successive year conquering Miss

Betz and Miss Hart 6 4 6 4

Byron Nelson voted the years top male athlete was Mr Golf of 1945 The was Mr Golf of 1945 The every many and the state of links arts two almost every many and the state of th

The United States Golf Association the body which controls the National Open the National Amateur and the National Public Links tournaments again canceled these four major fixtures because of war conditions. But soon after V J day the association an nounced that all four tournaments will be resumed in 1940 after a lapse of four years.

With the European war over the British P GA tournament was resumed and Corporal Charley Ward of Britishan S Royal Hr Force won the title with a seventy two hole score of 298 Corporal Lidoy 4 Vangrum of Los Angeles and United States champion in the Eastern theater missed his chance for the crown on the thrd round with a 79 for a total of 302.

Mrs Mildred (Babe) Didrikson Zaharias retained her western open title and was se lected as the outstanding woman athlete of the year

#### CELAROMA ACCIES RUN OFF WITH NATIONAL HONORS IN BASECTBALL COMPETITION

Basketball had another terrific year again establishing new attendance records. The Oklahoma A & M quintet earned the national mythical championsh p honors by stopping DePaul University 52 to 44 in a

charity game in Madison Square Garden be fore more than 18 000 people. The contest raised more than \$50 000 for the American Red Cross

Oklahoma qualified for the Red Cross game by winning the National Collegiate AA crown beating New York University 49 to 45 in the final round And DePaul earned the Red Cross invitation by whack ing Bowling Green 71 to 54 in the final of the eighth annual national invitation tour ney A total of 442 243 fans paid their way

stopping the Washington championship Redskins in the final play-offs of 1944

The year's college football was dominated as never before by one team-Army The greatest West Point eleven in history crushed all opponents in steam roller fashion as it marched to a record of eighteen consecutive triumphs made over a two year span

Colonel Earl (Red) Black's of the led by one of the most explosive one ty o punche in pigskin memory Glenn (Jun or) Di Felix (Doc) Blanchard blasted the r three



into Mad son Square Garden for twenty six double headers—a record total
The United States Vill tary Academy

quintet beat the Naval Academy 50 to 48 closing its season with a record of fourteen victories against one defeat-this coming from the University of Pennsylvan a and breaking a twenty seven game winning streak which started three years ago University of Iowa won the Western Conference championsh p And Vince Hanson of Washington State was the country's lead ing scorer with 592 points George Mikan set an individual scoring record pouring fifty three points through the hoop as his DePaul team beat Rhode Island State

In the first 1945 gridiron game the Green Bay I schers defeated the College All Stars 19 to 7 in the twelfth annual MI Star classic at Soldier Fiell Chicago before 92 7.53 Pectators on August 31 The Packers earned the right to meet the former college stars b) winn ng the National Football League bg rivals Notre Dame Pennsylvania and Navy by 48-0 61-0 and 32 13 counts

Across the country Indiana beat out Mich gan for the Western Conference title Alabama reigned supreme in the Southland and Oklahoma A & M was the class of the Southwest On the West Coast St Marvs was tops but in conference play the Univer sity of Southern California grabbed the crown and with it a bid to meet Mahama in the Rose Bowl The Sugar Bowl pitted St Mary 8 against Oklahoma A & M the Cotton Bowl matched Missouri and the University of Texas the Oil Bowl featured Tulsa versus the University of Georgia and the Orange Bowl listed Holy Cross and the University

of Miami In the 1945 \ational Professional League play-off the youthful Cleveland Rams Western winners pitted their Bob Water field Jim Benton pitch and-catch duo against the ageless Sammi Baugh and the Washington Redskins Lastern half titlists



Star Pilot with Jockey Richland up wen the fifty state tunning of the Faturity at Belmont Park

The Rams wen the championship 15 to 14 as Waterfield starred with two touchdown passes

The Montreil Canadiens and the Toronto Maple Let's chartel h.keys may it more The Canadiens finished on top in the final standings of the National Hockey Lengue and the Maple I eafs won the cherished Stanle; Cup play-offs turning bock it to Dentout Red Wings in a thrilling, seven game series The Maple Let's won the first three games of the play-offs the world series of bookey but the Red Winge came right back bookey but the Red Winge came right back eventh and final battle. Toronto-ched tout a 211 decision before 1s 800 first the largest crowd to watch a hickey game in Dettot history.

Finer Lach of the Canadians was voted the Hart Trophy awarded annually to the National Hockey Leigue player voted the most valuable to his team for the season

Alan Ford captain of Vales term was the outstanding individual performer in swim ming A native of Balboa of the Canal Jone Ford was a Navy \ 12 trainee at \ale dur-ing the past year. He established himself as the country's current fastest free style anuatic sprinter by setting an assortment of records In his final appearance in a Vale swimming suit he bettered the world's 100 vard free style record in his college s twenty yard pool sizzling over the distance in 49.4 seconds The previous mark was 40 8 sec onds made by the famed Johnny Weissmul ler in 1928 Ford also holds the international 100 yard mark for the standard twents five yard pool of 49 7 seconds In a dual meet with the United States

Military Academy I ord won the 50 and

sochard free style events but the Cadels still managed to win the team hoors 44 to 13. The sethack broke 1 ales sixty-six-dual meet winning stirred. Michigan State won the nati will 3 V.U. team crown with 26 points there mr. it has that scored by the Great Lakes Naval Franing Station. The Univerterior of the Station of the State even cr. with beating Olios State but the Buckers revered the decision in the Natural Collection 3 v. changed by the transfer of the state of the state of the transfer of the state of the transfer of the state of the transfer of transfer of

Crew racing again went through a cuttailed campaign with only Columbia Massa chu-etts Institute of Technology, Cornell and the Inited States Navil Academy end ing basis into the water Columbia claimed whit how is there were beating all except Sornell

#### THE POUGHEREPSIE REGATTA CREW RACING'S BIG EVENT WILL PROBABLY BE RESUMED

The annual I oughkeepsie Regatta which annually brought together college crews from coast to coast but which has been canceled since 1941 will probably be resumed on the Hudson River in 1946

Vaching its was conducted on a minor scale but such fittures as the Larchmoot Race Week and the Wanhassel Bay Vacht (lubs fall race series were continued on Long Island St und Cornelius Shelds probable but the most success with his Altern lie won the Royal Bermuda Vacht Club trophy and the season's series in the International Class
Son after V J day yachting officials in

mediately announced that the sport still go I ack to a heavy schedule next year The first international occurs going rare since the wat broke out in Furr pe the test across the Gull Stream from Neuport or New London to Bermuda has already been scheduled for June

#### SIR MALCOLM CAMPBELL WILL ATTEMPT TO SET A NEW MOTORBOAT SPEED RECORD

Motorbeating has been at a complete standard vacce the war started but the boats wall be back, in 1946 Sr. Valcolm Campbell the first man to attam a speed of 150 miles an boar in an automobile and who late raised the mark to 300 miles an boar is 20 mg to make an attempt to push has speed boat Bluebrad II above the 150 miles who was the speed of the speed

Horse racing came up with some brilliant

thoroughbreds Louis B Mayer s Busher a fifty was the outstanding three year-old of the eason Mrs Elizabeth Graham s Mane Chance Farm boasted two great two year olds Beaugay a filly and Star Filot a colt And Mrs Ethel D Jacobs Styme was the lastest among the older handlang hores; All of these thoroughbreds won at least \$700 cool in purses during the season of the s

#### THE BIG THREE YEAR OLD RACES OF THE YEAR SEE THREE DIFFERENT WINNERS

F W Hooper's Hoop Ir won the Ken tucky Derby Classic at Churchill Downs Mrs P A B Widener's Polynesian captured the Preakness at Pumbo and Walter M Jet fords Pavot came out on top in the Belmont Stakes at Belmont Park in the big three year old taces Incidentally Pavot which went unbeaten in eight races and was named the juvernile champion of 1924 was unable Belmon Staker race after his conquest in the

Titan Hanover a bay three-year-old son of Calumet Chuck and jountly owned by E Roland Hartrian and Major E G Gerry was king among the harness horses. He won the sport's most important event the Hambletonian in two straight heats at Goshen N Y Turchased for \$5,000 as a yearing Titan Hanover has already won more than \$50 000 in puress Titan was the first two year-old even to tot a mile in two minutes flat and is unbeaten both as a two-year-old and as a three year-old

#### EXTERMINATOR ONE OF THE GREATEST RACE HORSES OF ALL TIME DIES AT THIRTY

Taterminator, regarded by many turlinen as the greatest race horse in story ded last September 26 at the venerable are of thirty at the farm of its owner Vits. Will a Sharpe kalmer Known as Old Bones Externina for competed in 100 races and won exactly half of them Among hs conquests were the kentucky Derby Saratogo Coty three times the Pimil co Cup three times the Pimil co Cup three times the Jandicap Townst and Acotum Gold Cops and Probability Indiandicap
Dermil Every of New York, continued

Tolling up victories on the feneing strips. The veteran regained the national foil title an honor he held in 1938 and 1940. Thor Nil las also of New York, retained his national saber crown while Mack Gilman a new comer from Ill nois won the national épec weipon.

Joe I latak first class seaman in the Navi regained his supremacy among the country's handball players. He had held the national AAU four wall singles championship for eight consecutive years before Frank Coyle of the New York AC beat him in 1944 But Platak came back stronger than ever and beat this same Coyle in the 1945 final 21 10 21 8

Doe fancers as usual had an enjoyable year despite the fact that most shows were limited because of transportation difficulties Mr and Mrs T H Snethen gaused the most coveted honor of the year when their Shellings Signature an unheralded Scottish Ter tree won Westmintter's best in show a ward at Madison Square Gardon or Pebruary 13 at Madison Square Gardon or Pebruary 18 the state of the stat

With the war over the cognoscent in the field of sport predict that 1:046 will see the return of compet ton on the pre war scale and that spectator interest in athletics will enjoy a terrific boom. The airplane is expected to play an important part in this new sports era. In crnational competition is sure to increase now that peace is here.



As eight man shell on the Charles River at Beston.

# **STORE**

OF YOUR OWN

By Wilford L White

Acting Chief Division of Small Business United States Department of Commerce



HAVE you ever thought that you would like to own a candy kitchen or a gro cery store or a hardware store with a display of shiny tools? Take for example a grocery store The next time you go into one look about you There is a can of coffee It may have come from South America probably Brazil Over there is a jar of olives possibly from Spain Look at that row of boxes con taining sp ces Some of them came from the West Indies Africa China India or Yugo slavia There is hardly a shelf which does not contain something which came from a foreign country. It may be something cured under the tropical sun shipped part of the way on camel or donkey back and handled by men and women in foreign dress who sneak foreign tongues

The storekeeper brings all these products together from all the ends of the earth. He purchases them in large quantities through importers and wholesalers and sells them an small amounts. Because he sells in this way he is called a retailer. The verb to retail means to sell as small amounts.

About as long as you can remember you have known what a retail store is Such stores are everywhere in little communities as well as in hig cities. They range from huge department stores to very small shoos.

There are many different types of retails stores as you know from your own expenence. If you live in a city, you know that department stores have a great vanety of goods, sometimes including even food produts. You know that neighborhood stores near your home sell grocerres and drugs and landware You are also familiar with stores hardware to are also familiar with stores have the production of the production of the linery and men's hats. These stores are owned and operated by retailers who invest a great deal of money in buying the goods they wish to sell at a profit Did you ever stop to consider how impor

tant these retailers are and what they, do for sou and your femeds? Just suppose that all the stores near your home disappeared over inght. Where would you get your processes? Your desses or susts or shoes? Your solds to the store of the store of the store of the out where the wholesalers and manufactures are who sell what you want They you would have to go to them all. That would be difficult in our impossible since one manufacturer makes only chocolate burs amount turer makes only chocolate burs amount of the store of the store of the store of the store makes only sign to the skind you would be very bungry and very tured before you had what you needed.

Refailers from whom you buy serve as your purchasing agents. It is their business to have what you want when you want it in the right size style or color and to sell it to you at a reasonable price. Storekeeping is a real job. It takes training and experience but it can be a lot of fur.

but it can be a lot of fun
Because so many persons are interested
there will probably be 500 000 new stores
opened in the United States this year Now
during the time those 500 0 o new stores

opened in the United States this year how during the time those 500 o new stores are opening up about 500 000 other stores will close their doors. That means that at the end of the year the total number of stores will be about the same as it was at the beginning.

Why do so many stores close? During the recent war, there were three main reasons (1) the storekeepers could not buy mer chandise to sell (2) they could not hire new workers to take the place of those who left and (3) many storekeepers left to join the

armed forces During the war, hundreds of thousands of stores--most of which were

But many stores, large and small, went out of business before the war-usually more than one thousand a day Why did these stores close? Well, most of them had failed to make a living for their owners. Often the trouble was even worse. Many of the storekeepers had gone into debt and could not make enough money to pay their bills To owe money which you can not pay is a dis aster Such disasters happened to thousands of storekeepers, and it is important for you to understand why they happened Prima rily, the storekeeper was not well acquainted with all the problems of running a store. He lacked training and experience. He did not have enough money to begin with Some times he located his store where there were not enough customers to keep it going. Some times he sold too many things on credit and did not insist that his customers pay him when they agreed to do so. There were other reasons, too, but the main one was that the owner did not know enough about running a store to make a success of it. You ought

small-were obliged to go out of business

to keep that in mind

Many people who have the ability to own
a store and run it successfully, never do so
simply because they have not studied such
a venture carefully. The first step in this
direction is to consider what type of store
you want to own You should open a store

which can offer for sale what people need and want and are willing to buy from you Remember you are to be the purchasing agent of the people who live near your store You must know what they want or your store too will disappear in a year or two and take all your investment with it

Here is a list of stores. It is not complete but it will suggest to you some of the oppor tunities there are for small storekeepers.

Some Popular Kinds of Small Stores
Wear Shop Nessetand and Smoke

Shon

Roys Rear Shop Drugstore Electrical Apphance Stor Food Store Hardware Store Jewelry Store Men's Wear Shop Paint Shop Radio Shôp 1 Shoe Store Bakery Shop Book Store Candy Store Ice Cream Parlor Leather Goods Ston Romen's Apparel Shop

Photography Shop Sandwach Shop Sports Goods Gore Sports Wear Shop Beauty Shop Blouse and Sveater Shop Children s Wear Shop Gift Shop Interior Decorat n Shop Knitt ng an I Embroid ery Shop

Leather Goods Store
Women's Apparel Shop

This does not mean that all these different
kinds of stores can be successful where you
are located 1 you mucht arter that you could

not be successful in a town of about five

u should open a store hundred people, if all you sold was candy at

Rad o and Televis on Reta 1 no

A radio and televisi repair shop offers fine of portunities for the n chanically minded you man. Most of these sto also sell accessories a



It is extremely important for most retail shape to be close to the center of town. This ries of the male street of a small city is typical of stamp houseast districts ever much of the world is such e. location as neitractive street becomes its own advert sensest, but by boing where many people pass and can see it. Many slope windows are charged from work to werk so but the latest fealures is always an display

sixty cents a pound. Yet in the larger cities where there are more people to buy this candy, there are many such stores making a profit.

After you select the kind of store you would like to have there are many other things which you must know Running a store profitably is not so easy as you may think Here are some of the things you must do

1 You must select a good location A retail store can not go to its customers so the customers have to come to it. Many customers have to come to it. Many customers go to the store which is most concennent. That is particularly true of such stores as goociese, hardware and drugstores. For other kinds of merchandise however most concern the best location would usually be the center of town, near other stores selling similar merchandise. Selecting a good location is a very important matter.

2 You must prepare the store for bussness After the location has been selected, a great deal of attention needs to be given to the building and to its interior so that people will be attracted to it and encouraged to go inside The character of the front win dows and whit they contain will indicate the character of the store Signs outside must be neat and clean. The interior should be bright and shining. The merchandise needs to be laid out curefully so that customers will know where to look for it with the least amount of trouble and delay All of the last to be done before the store can be opened for business.

3 Ion must buy your merchandur There is an adage which says Cook well bought are half sold. Most small retailers do not buy direct from manufacturers. They buy most of their goods from neighboring whole salers manufacturers agents brokers or other types of middle-men Since a return was reveil in goods to a customer before he make a profit he must really known before he buy anything Otherwise he is apit to buy what the salesman wants to sell him That can be bad

4 You must sell the merchandus which you buy You are familiar with the selling of all kinds of goods Before you see it on the shelves, merchandise must be unpacked sorted priced and marked for sale If you have a good memory, it will help you very much in waiting on your customers for you

.

will know where each article is and can find it at once If a customer asks you for some thing which you do not have in your store you will not have to waste time looking through your stock to see whether it is there or not You can say at once that you do not have it You should know enough about your merchanduse to know whether or not you can obtain the article your customer that it will be profitable for your feel do you whould tell your customer that it will be profitable for your feel do you whould tell your customer that it will be profitable for your feel do you you should tell your customer that you will be glad to get it for him

Drawing your customer is one of the important points of selling. Many successful retailers make a special study of selling. Some courses in salesmanship are very helpful. Whether or not vou study such a courseyou should remember that a customer will come back to your store again and again if you have made him like you and trust you Otherwise he will do his best to hus, what

he wants at some other store

If you have clerks to wait upon your cus
tomers you will have to hire and train them
You will have to see that they are helpful
to the customers. You will be able to make

your clerks into much better salesmen if you are a good salesman yourself

are a good circuman yourself.

In order to sell your merchandise you must find ways of bringing customers into your store. In a ld tunn to having a good location an attractive store and things for sale that people want you may wish to bring in

more customers by letting them know what you have for sale 'Abertsing will help you do this You may advertise in the newspaper or over the radio Handbolls are another beeful way to advertise your store You may write the handbolls yourself and even dis tribute them yourself but you will have to nod a printer to print them for you

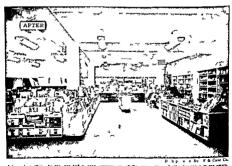
5 You must make a profit A retailer buss his goods at one price and sells them at an other and higher price. The difference between what he has paid for a prixluct and the price he gets for it is called a margin This margin is very important. If it is too high the product will be too expensive and nobody will buy it. If the storekeeper always tries to make as big a margin as he can peo ple will soon come to think of his store as very high priced and they may try to do their shopping elsewhere On the other hand the storekeeper can not afford to have his margin too low. If he does he will soon go out of business. He must make sure that hi margin is large enough to pay the expenses of running his store. He has to pay the rent on his building salaries to all who work f r him and the interest on his loan if he has borrowed money from the bank. The money which remains after all expenses have been paid is clear profit called net profit The storekeeper may be able to keep this tioney for himself to pay he living expenses and to use in any why he pleases. But the good re-



The curner drugshers a sulfar to easy yer have seen. Calertal porters to the graduate the products the adventury and the new well are and a sulfar a

## A DRUGSTORE IS GIVFN A NEW DRESS





[ 296 ]

~3<sup>1</sup>25~

tailer thinks twice before he fritters his prof

If he wants to build up his store he may put part of the profits back into the business. He may use it to increase the size of his stock-that is he may buy a larger amount of merchandise so that he will have more to sell Or he may spend some of it on improv ing the appearance of his store perhaps buy ing a better display case or installing a bet ter kind of lighting He may think of any number of ways of spending his profits to make changes in his store. In each case, he must consider the change very catefully to be sure that the expenditure will prove worth while This is especially true if he is thinking about spending his profits to enlarge his store If he is in too much of a hurry about making his store bigger and if he buys more stock than he can sell he will find himself in all sorts of difficulties. One word for this kind of trouble is overexpansion. In plain ordinary language, he has grown too big for his boots

6 I ou must keep records 'Today the re tailer trust know how to keep books. He has to keep track of what he buys of what he sells and of what he owes I he sells on credit he must set up an account for every credit customer and seed him a monthly statement. He must keep a careful record of all income and eepenses so that he can re port on Social Security and make out his tax reports. Record keeping is very important. One of the chief reasons for business failure is jumillingness or inability to keep an accurate record of all transactions every day, just as they happen.

7 You must keep a clean store A retailer should be a good housekeeper He must keep his store clean wash the windows regularly sweep it every day have everything look fresh and new see that his clerks are neatly dressed and make the store so inviting that become will want to come back.

Now if the store is a very small one the propretter may have to do all of these things insself. Then he will have to get to the store early in the morning and sweep out before he opens the store for business. He must talk to the wholessle salesmen and at the same time, make sales to his customers. At night alter closing he must check his stock and after closing the must check his stock and after check to cover the bills which have come in and decide what he is going to do tomor tow other than routine work. Only then can



Ew ng Gallows

These crowded windows and ogly signs do nothing to make this men s wear store attractive. Its only appeal lies in the premise of a possible bargain to be had,

he go home. He can not be a clock watcher Now let us surmarize the opportunities and responsibilities the favorable ledeas and the unfavorable ideas concerning your own small retail store. Here are some of the favorable points.

The business will be yours and you will be the top man or woman in it

2 If you have a new idea you can put it to work right away and if it proves to be a bad one you can drop it just as quickly

3 You will manage your own time and capital and any profits you make will be yours to use as you see fit

4 In the early months of your store some of the members of your family may help you so that you will not need to spend your in come in hiring help

5 As your business expands you will be come an important member of your community. You will be able to help others less for tunate at the moment than yourself. A great deal of pride and self satisfaction can come from your own hard work and success.

But before you reach any conclusion please think about the points on the other side

I When you are boss and owner of a retail store you are responsible not only to yourself and your family, but to your employees, creditors and customers You are the one who has to meet the payroll every Saturday and who has to find the interest for



Buyers for d ess shops aften visit wholesale houses to select their merchandise. Here we see two models dis-playing evening gowns for the approval of buyers. In addition to selecting attractive styles the buyer must check quality and p rcc. And mo e impo tent, he must know just what type of dress his customers will must to buy

that loan at the bank every month

2 Every final decision is up to you No matter what the question is you will have to decide what to do in every instance scores of times a day

3 No retail store will run smoothly even after it has been open for a long time A hundred and one things come up unexpec tedly You must be able to adjust yourself and your business to constantly changing conditions because many of these problems will be outs de your own control 4 You will have to work hard probably

harder than you have ever worked before For instance in many cities retail grocers must be up and at the fresh produce market by five o clock each morning. No matter how you feel the store must be open six days a week from a certain hour to a certain hour Good customers may want you to get things for them after hours Saturday is often the busiest day and there are no vacations around Easter or Christmas and no entire summer off to go to the shore or the moun

tains or the lake or to take long trips

5 Even after your store has grown larger and you have several employees the chief responsibility is still yours day in and day out If you try to dodge the responsibility it will not be long before your creditors take your store away from you

If you still want to own and run a small store the next thing to do is check yourself and determine some of the things you need for success It will pay you well to develop those which you tack

I What experience do you have? Boys have a greater opportunity to gan experi ence than g rls have because they can deliver packages open boxes shelve stocks and do many things about a store even before they can wait upon the customers But girls can gan experience too as checkers in grocery stores or as typists and clerks in department dry goods and other larger types of stores

2 School work in arithmetic writing spelling and English grammar will give you important tools for running your store Typing manual training and public speaking will be a great help to you Every store, owner should have some training in cries retailing and salesmanship Remember experience and training are important and there is no substitute for them

3 Do you lake to be with people and work with people? If you would rather curl up in the corner with a book or go about ex ploring the out-of doors alone you should forget about running a retail store You will have to work with people every minute of the day.

4 Are you willing to work hard long hours? Owning a business is really hard work and you must keep at it every business day of the year Every year This is a very important point

5 Do you have imagination and initia tive? It is not enough to have a lot of new ideas. Your ideas must be practical ones which will work and produce more profits for you. You will have to make your own decsions You will have to plan ahead for your store not just wait until things happen and then decide what to do If you do not like to think things out for yourself and if you are slow in reaching a decision do not plan to own a store

6 Do you save your money or spend it as fast as you get it? To run a store well you have to save so that you can buy more mer chandise in season or be ready for a bargain or give your store a fresh coat of paint when it needs it You must have more on hand when you want it or your competitors will

take away your trade'
7 Are you as good as your word? Of
course you realize that you must be honest
careful and ready to help others A retal ler
carries on much of his business by word of
mouth that is by promising to do something
at a future time. If he fails to do what he has
promised to do he will not be in business
of one of the fails to the history of the control of the
and open has store each morning when it is
convenient to him or pays his bills only
when he happens to feel like it pretty soon
he will not have any business at all. Possibly

F lomena's Hobby Nu ley N J
The young lady who owns a gift
shop has the joy of selling wares
that are novel and differentpottery hasker's toys and hus
dreds of other bright and exciting
articles





the most important point of all is liking to help other people. If he is selfish and always thinks of himself first, he is not going to be a good retailer.

Now if you become a retailer a good one what reards are there for you? There are a great many as any successful retailer will lell you You have be astisfaction of bring mg from the ends of the earth goods and services which the people in your community need and will use You help these people have a pleasanter happer life You help thany of them in their emergencies You help them with their problems in doing these things you will make many friends who know you are a fine person and who value your friend

Second you will be a very important part of the world of business No manufacturer could keep his machines go ng a week were it not for the retail store which tells him what the customers want and which ees that the custom ers get it after it is manufactured. Without the retailer business would jerk to a standstill Our whole way of living would

have to be made over

The day good retailer has the joy of bring ing things and people together and creating a business a successful business. Just as you abusiness a successful the properties of the properties of

creative ability results in a sound profitable business. There is a healthy pride which gives a glow to everyday living in seeing one's hard work and effort bear fruit. Leep ing an attractive store sometimes brings out artistic talents the owner did not know he

had Fourth a successful retailer can do a great deal of good in his community by supporting everything in it which will make that town a better place. If you check the mem hership of the luncheon clubs, the names on the boards of directors of the chamber of commerce the local hospital county fair churches and other community activities you will find the names of many retailers You will find storekeepers holding civic of fice on the city council and school board Many storekeepers are able to give these community responsibilities the same honest hard working support that they have given to their own businesses. In doing so they aga n have the satisfaction of helping others without seeking any direct return

Finally a successful retailer receives a reward for his labors in the form of the net profit which his store produces It will provide for h a family and humself many of the work of the first produced in the first produce



Pub shers Week



Plants turn the sun s energy into food, and then we eat the plants to give us energy for play and work,

# Our Debt to the SUN

By Morris Meister

Some day there no longer will be any coat or oil for man to use, how soon can not be predicted exactly, there are differences of opinion among scientists. Yet that time will surely come—one thousand, ten thousand, or perhaps one hundred thousand years from now-if we continue using fuel at the present rate How, then will man do the world's work? Trains and steamships would stop, since they require coal or oil A great many of the machines operated by electricity would cease to turn because most electric generators are driven by engines re quiring steam or oil The few that are driven by water turbines would be hardly sufficient for modern purposes Electric cells and bat teries can not do the work. The automobile would be motionless No airplane could leave the ground Many homes would be cold and most factories would be silent Of course, we should still have the wind and flowing water, such wood as could be had from forests and the fuel that can be manufactured from plants Yet modern civilization could not get along on these sources of power alone

Gol and oil are the remains of centam plants and tiny animals which lived millions of years ago. These ancient living things used sunshine, just as plants and animals do today. Each time we burn a lump of coal, and each time we "step on the gas" we are using up the energy of ancient sunshine. The am is still shaning and its energy is being sent by fiving things that could some day energy and the still shaning and the energy is the great deposits of coal and oil. But we may great the present day of the day and a still sharing and the great deposits of coal and oil. But we may be supported the still sharing a still sharing the still sharing a still sharing a still sharing the still sharing the sharing the still sharing the sharing

ginning to make progress in both directions. Let us consider first what might be done to barness the sun for doing some of the work of the world

Day after day, the sun pours out vast amounts of energy It is estimated that the earth is surface receives from the sun each year the equivalent of many thousand horse power for every square mile. If we could make good use of the energy absorbed by even a dozen square miles the threat of a coal to the could be supported by the could make good use the threat of a coal to the could be supported by the supported b

In the year 1866 Emperor Napoleon III of France visited the shop of a French in ventor named August Mouchot In the yard of the shop stood a large, cone shaped object resembling a huge lampshade. The opening of the cone was directed toward the sun its inside was lined with a thin film of silver At the small end of the cone lay a small cop per box, blackened on the inside The Em peror was told that this curious device was a solar engine, that is, a sun engine. The rays of the sun were gathered by the cone and reflected by the silver lining down upon the small copper box which contained water The heat caused the water to boil So im pressed was the Emperor that he urged his government to support and finance the building of many of these solar engines Yet, the scheme was not very successful

After Mouchot came several other inventors of sun engines All of them used one or more of three important arrangements for collecting the sun s rays—the coincal mirror, the cylindrical reflector, and the hot box an artight box, black inside, and covered with two layers of glass. Heat waves pass through glass, and black absorbs heat

A solic engine was set up in the Arman desert in ropa I tused a cone shaped reflector and weighted about 8 300 pounds Seven hundred square feet of sunshine was collected which botted water into steam which not un operated an eign e. In 10/3 a solar number of the solic properties of the solic p

One of the most workable solar engines ever built stands aton Mount Wilson in Califorma It consists of a large cylindrical aluminum mirror that is free to rotate about an axis parallel to that of the earth's A clock mechanism causes the mirror to follow the apparent motion of the sun. The rays of the sun are focused on three continuously connected oil filled glass tubes about six feet long Each of these tubes is covered with two other tubes which enclose a vacuum so that very little heat is lost by the oil As the oil gets warm it rises and soon a circulation is set up from the oil tubes to a storage tank and from the tank to the tubes As this con tinues in the sunshine the oil gets warmer and warmer sometimes reaching a tempera ture of about 300 degrees Fahrenheitwhich is hot enough to bake bread cook food or boil water into steam for power pur poses Seven hours of sunshine a day are enough to keep the machine going day and night at about 212° F Th's machine is sometimes called a sun cooker

There have been other efforts to make use of direct sunshine One of the most interesting is to use the sun's heat to produce cold you are familiar with the type of kitchen re figerator which is operated by a gas flame. The heat of this flame eapparates a special hund called a refingerant. The evaporated refingerant (now a gas) is the compressed When the gas is allowed to evapand again papilly it produces a cooling effect which freezes the ice cubes and keeps the foot cold freezes the ice cubes and keeps the foot cold Similarly the sun's heat pouring down upon the roof of a tropical bungalow can be made to evaporate a refingerant which can then

keep the air inside the bungalow cool Another scheme for making direct use of the sun's energy is to allow it to heat the unction of two pieces of different metals When this is done an electric current begins to flow in the metals. The current though small in amount can ring a bell light a lamp or run a motor The metal junctions are called thermocouples. Some years ago a German scientist by using several thermo couples succeeded in keeping an electric lamp lit by sunshine for several months A French scientist has proposed a plan for connecting together half a million thermocou ples The junctions would all be exposed to the sun and the ends would be embedded in concrete so as to keep them at a lower tem perature. In this way huge amounts of electricity would be obtained Unfortunately the cost of building the arrangement would be too great as long as there is still enough cheap coal and oil available for generating all the electricity we need



The most likely use of direct sun shine in the future is the opening up of desert areas These regions have steady sunshme and they are usually far from coal and oil If the sun's energy can be by some caught form of solar engine it can be changed either into the heat energy of steam or into electrical en

which we describe in text Here it is made run a small printi ergy With energy available many such deerts can be irrigated and transformed into fertile farms and gardens. Excess electrical energy can be sent out to other regions which do not enjoy such intense and steady sunshine.

We spoke of finding sources of energy that do not depend on the sun Men have dreamed for years of using the power of the tides and successful experiments have been made The greatest field for power research today is within the atom Ceaseless activity goes on inside the atom and an enormous amount of energy is occasionally developed accidentally when atomic particles collide Some atoms as you know are breaking up and giving off (radiating) energy Radium is one of these elements whose atoms are breaking up Other atoms can be made to break up We call the process atom smash ing For some years atom smashing has been going on in laboratories all over the world Not until 1945 was a way found to employ the energy thus created (See Atoms and ttom Power ) The use for atom power so far has been for destruction. When we can learn how to harness the enormous energy that is now locked within the atom we shall have all the heat and mechanical power all the electric power and light that we need But even then we shall be dependent upon the sun for other things

#### THE ENORMOUS HEAT OF THE SUN OUR SOURCE OF ENERGY

The sun is a star some 91 000 000 miles away it consists of many different by res of FUSEs at a very high temperature. The tem perature of the surface of the sun is estimated at about 11 000 degrees Fahrenheit This is twice as hot as anyting mun his been alle to devise. The sun's interior may be ten times hotter. At these temperatures the molecules in mitter break d win into the three particles called atoms. The atoms the molecules in mitter break d win into the surface and the surface sending out rays of light and the perature called atoms. The atoms of high and the perature called atoms the start her such the earth they can cause a pretty severe sun lum in less than fifteen milium?

The sun is the hasts of our est tence and the source of all our usable energy. There are several forms of energy light heet me chanical electrical and chemical Fach form can be changed into another. The starting into most of these changes however is the left energy, which purs down Irum the un't hus have probable tired to concentrate the light rays of the sun with a magnifurge.

plass or a marrier. The light changes into heat which can boil water into steam. The steam can turn a small dynamo. Thus the beat energy is changed into mechanical energy. The dynamo generates electricity showing how mechanical energy. Electricity can decompose water into horgen and ovygen. This is a change from electrical to gen This is a change from electrical to chemical energy and the energy within the atoms of matter all means for carrying on life activities come to us from the sun.

#### HOW MAN USES HEAT ENERGY TO GET ELECTRICAL ENERGY

The rays of the sun cause the water of lakes rivers and oceans to exported into the air. Later the air mosture condenses and falls as rain snow or half. This fills the rivers which can be dammed so as to store water at a height. When allowed to fall and press against the blides of a turbine or water wheel the mechanical energy is changed to electrical energy.

The sun warms the land and the water but water heats up more slowly than land and then hol is the heat for a longer time When the land is warmer (during the day) the air over it rives letting in the cooler 'eabreezes' When the sea is warmer (during the night) the air over it rives letting the cooler land air blow toward the sea.

You know that the earth is tilled with respect to its path around the sun You know that because of this till certain regions of the sun while other regions receive the sure and concentrated rays of the sun while other regions receive the area. The summer season comes to those parts of the earth which are bittled by direct sunshine, and the winter season arrives where a section of the earth receives the rays slantwar. Reg ins near the earth's Figuator receive rays that are close to perpondicular enough the summer weather all the time.

Areas near the Poles never receive direct rays and have periods when they receive no sunshine. So polar regions are a ways cold

The fact but certain areas are always warm and others always cold sets up bure movements of the air. As the earth spin these air movements are crused to swerve and gue rue to the well known until belik It is in these moving air masses that wreather comb tons start. In a sense them the sun is responsible for our weather. It is the suns energy which heats the land betts the air.



Another kind of solar engine-the flash boiler

and causes the art to use and which evapor rates the water into the air Even the electric storms are due to the sun because evaporation produces electrical charges in the mois ture particles and some of the sun's rays help to increase these charges. We owe to the sun our seasons, our climate and our weather

Light can stimulate the retina of the eye The eye lens forms an image on the retina and the brain interprets the stimulus as the picture which we see Certain chemicals are also affected by light A piece of photographic film contains small grains of a chem ical called silver bromide. This silver bro mide is colorless and opaque (Light can not pass through it ) When light strikes the film the molecules of silver bromide are changed so as to leave a black silver deposit. This is what happens when a camera lens forms an image on the film Even when you take a snapshot, the momentary flash of light produces an effect on the silver bromide The effect is later continued when the film is de veloped and the picture printed from the negative

neconstanced in similable is a lend of ray called attracted. This ultravolted hight is colories and invisible to our eyes yet it makes its presence known and fell. It is very penetrating and is responsible for sumburn by the mercury vapor lamp which is a coloried of ultravolet hight. While direct sum inght can produce a burn in about fifteen minutes, a mercury, lamp can cause a similar, minutes. The nature of kith information that manutest. The nature of kith information is the manutest. The nature of kith information is the sum of the manutest. The nature of kith information is the manutest. The nature of kith information is the sum of the manutest. The nature of kith information is the nature of

ning is quite interesting. The action of sun light on the skin or of the ultravolet rays contained in sensight, is to produce a substance called vitamin D on the surface of the skin. The same vitamin D can be produced in foods such as milk or oils and fails by exposing them to ultravolet light. The vitamin D is necessary if our bones are to grow strong and it is most important to general good health

It has been shown that ordinary window girss allows most of the sun's hight to pass but blocks the rays of ultraviolet. That is why we are warmed but not burned by the sun in a glaseed in porth or sun room. There are special types of glass which permit the passage of the ultraviolet rays. There is room for much further study and improvement in this field.

Every leaf, every blade of grass enjoys a secret which the wisest scientist does not know. For years scientists have been trying to find out how plants make use of sunshine We know that water and minerals come up from the soil through the roots and stem of plants to the leaves We know, too, that there are millions of openings on the under surfaces of leaves which let in air containing carbon dioxide Then in the presence of a green material called chlorophyl and while the sun sends down its rays, a chemical ac tion takes place in the cells of the leaves As a result of this action, carbohydrates are formed and oxygen is released to the air Carbohydrates-starches and sugars are ex amples of carbohydrates-are the food which the plant makes for its own use Then we eat the plants Thus corn, wheat, fruits and vegetables are the products which plants manufacture with the help of sunshine They are the food for all animal life, including man Yet we do not know all we should like to know about the chemical process in the leaf which means so much to our lives

#### A GREAT RIDDLE STILL TO BE SOLVED-THE SECRET OF PROTOSYNTHESIS

Who will solve this mystery and learn the secret of photo-ynthesit, as the chemical process is called? The scientist who succeeds will releve the farmer of many heavy tasks and uncertainties. He will abolish forever the ear of exhausting the supply of coal and oil He will have found a way of duphrating na ture's own solar engine—the leaf

It is estimated that one hour of sunshine falling upon a square yard of leaf surface results in the manufacture of about one gram of carbohydrates. No wonder each plant al ways turns its leaves so that they catch as much direct sunshine as possible! In an arer of plants there are about two acres of leaf suriace. During a summer s growth a wheat field may take from the air about eleven tons of carbon droude and with the help of sun energy it will manufacture about seven tons of wheat!

Several scientists have already been able to duplicate he process of photosynthesis on a small scale in the laboratory It is as vet too costly for Large scale manufacture Many are studying the substance chloro plily whose presence is essential to the process in the Boyce Thompson Laboratory for Thank Research, at a 'on-hers' New York some very interesting experiments are now some very interesting experiments are now some very interesting experiments are now been obtained in an effort to change and control the growth of plants.

Matine plant life is also affected by the hight and heat of the sun. In the oceans three exists a lind of one celled plant called the diatom. Diatoms are bacteria of a sort which with the help of sunshine can produce the starch needed for their growth 'Small marine animals feed on the diatoms. Larger [sh feed on the smaller ones and so on Thus the sun mantans life in the

oceans

The heat of the sun also affects all animal life. In the winter time in the Northern Hiemsphere the sins sclosest to the earth However since the suns rays at this time reach us slantwise and not perpendicularly, intile heat can be gathered. This absence of heat and the decrease in amount of sunlight, which heat can be gathered. This absence of heat and the decrease in amount of sunlight since the days are short) causes many animals to hibernate that is to go into a sleepy state for the winter. Snakes lizards frogs, most will be area and is a supported strete for the winter.

out occasionally, for food it is likely that many animals would scarcely be seen during the winter months. As the earth revolves about the sun and spring arrives the animals come out of their partial sleep. They become active. Everywhere on the earth animals tend to follow the sun. This is not just accidental. It is necessary for the preservation of their lives.

It is sometimes asked how long life could exist without the sun Would life suddenly cease or would there be a gradual decay. As you know in the far north there is an almost total lack of sunlight for about six months. Does life cease during that time to be resired with the coming of the sun? Yo enough energy is stored away during the dark period to maintain the necessities of life Animals hibernate and become dormant Wan needs more than just food and shelter He can not afford to hibernate I ife must go on

Should the sun fail to make an appearance for a single year the result would be runous Plant life as we know it would vanish and animal life would soon follow

Is there a substitute for the sun? Can an artificial sun be created? The nearest thing to an artificial sun is artificial ultraviolet light. However, it requires electricity to operate the mercury vapor lamps and electric

ity is dependent upon the sur

Our debt to the sun is one that can not be repaid. Ill our lives we are indebted to the sun for food, clothing and shelter. There is only one thing we can do to repay in part this great debt. We can practice conservation. This means saving and not wasting it is true that the suns, energy is apparently endless yet we must learn to take all we need and yet leave some for succeeding generations. In this sense conservation means carreful and purposeful use. Only in this way can we rereal partially our debt to the sun.



lies and and water produce power. The sun draws water raper up from the effect to form in clouds, Calified it paning over mountains, the water raper condenses and fells as exis into the reserveir. Where to ling from the draw farms to their in the power house. The tripling causes a dynamic or generate electricity.

### HIGH SCHOOL

## TEACHING

AS A CAREER

By Lloyd Shaw Superintendent Chevenne Mountain Schools

→ THEN I was a very young teacher I knew a great high school teacher of Latin and Greek I visited his home one day and there I found to my astonishment that most of the books in his library were in still another foreign lan guage When I exclaimed he told me

something which I have never forgotten The trouble with me he said is that I love everything When I see a miller at work I want to be a miller And when I see a stonemason I want to know how to cut and

lay a beautiful wall

And that is why he was a great teacher Like this wise man you must always have many interests that you enjoy sharing with young people Never lose your enthusiasm for it will help you to make your classes worth while and a great deal of fun besides

The good high school teacher likes to play with ideas and to talk them over with his pupils. This sharing of ideas is one of the greatest joys of teaching There is all the wonder of science all the new discoveries that are constantly being made. And there is government! These are days brimful of drama To become aware of the meaning behind the drama to share the awareness with those to whom it will mean most-that is a thrilling experience In I terature and the arts there hes another vast world of ideas When you try to explain them to your pu pils you will have the creative joy of play ing with great ideas in words of your own

Good times out-of-doors can have a great deal to do with teaching high school. For in stance do you like to go camping? \Imost every boy and girl enjoys the stream the campfire and the open sky Or fishing? That is a splendid sport. What marvel his things there are to do! Hiking and swimming and



Alert looking students like these make teaching a Joy

horseback riding skiing and skating and other winter sports You need not give up any of these good times if you teach high school boys and girls This is a point I want you to understand The good high school teacher shares as many activities as he can with his pupils

Teaching high school is a dull business if all you do is lay out a few pages of dry text to grind through each day You will have a weary time if you try to make each years work exactly like that of the year before If you allow your subject matter to become your students will have no old and set zest for learning and you will fail

But the more you enjoy your life as a teacher the easier it will be for you to keep your courses fresh and new and vital

Sharing your ideas and good times with your pupils is fun of course but it is also very important for it will help you to under stand the boys and girls whom you are teaching When you know what interests them you will be able to arouse their en thusiasm as naturally as you breathe

A high school teacher is off to a good start if high school is the one kind of school where he wants most of all to be It may be the right place for you if you like one of your studies better than any other Suppose you like English so much that you would be per fectly happy teaching nothing but English If you would rather teach Figh h than any other subject high school will give you the

opportunity you want, for in most high schools the teacher is a specialist. You may be a mathematics teacher, for instance Or you may like science best Many high schools offer you the chance to specialize in your favorite branch of science so that you may be a chemistry teacher or a physics teacher If history appeals most to you, you can even choose the period you prefer and teach noth ing but ancient history or English history or American history Many grade schools do not offer you the same opportunity to teach only one subject

ou should also think about the ages of the boys and girls whom you are planning to teach You will fit into high school teach ing best if you are happiest with high school students Before you come to a decision it will pay you to consider carefully all the grades and all the ages covering school chil dren's range Which ages would you like best

to teach?

Some teachers mostly women, prefer the youngest pupils-the primary grades or kin dergarten Others-and this includes some men-prefer the upper grades Many prefer the junior high school with its attempts at being grown up Some like high school best

of all, and I am one of these At first I thought I would rather teach in a college To work with young college men and women would be a great satisfaction I was tempted, too by the greater dignity that seems to go with college teaching Here I had a little problem in what dignity really is That is one kind of problem which you will have to decide for yourself some day

But I should like to tell you what I thought about it Dignity, I concluded should de on what 10b you do

College students are young adults and they have become more set in their thinking than high school boys and girls Now high school students are very young. But their abilities and skills are approaching those of grownups and they are old enough to share much of their lives with you I knew that I would enjoy working with these young neonle most of all and so I chose high school I have loved it A high school teacher, if he

will can have a perfectly glorious life What kind of person should you be to make a success of high-school teaching? You will need good health and a sound strong body You will need a good mind and fine character-honest unselfish and well bal anced If you are ambitious and wish to ad vance rapidly to one of the best teaching tobs you will need to acquire certain out standing traits One of the most important of these is enthusiasm which we have al ready discussed Another is the habit of looking as well as possible Your puptls will admire you more if you do and so will your fellow teachers You must learn to be fair in every situation that comes up and never to favor one student above another You should be a good leader and a good friend as well It will be a great help to you too if you learn to speak well in public And you must not be afraid of the hard work you will have to do, for it will not seem like work if you learn to en ov it



Round the table discussion in an education course Learning to be a teacher is a lively enterprise



From All the Ch ldren Learning Spanish the modern way by reading a newspaper published in that language

What education will you need to be a good high school teacher? Well the best start that you can make is to be a good student now What else? You must plan to have two kinds of education—general and special

A general education includes college, all four years of it at the least In accredited high schools a bachelors degree is a stand and requirement for teaching academic subjects—that is such subjects as chemistry mathematis. English or history High schools in some states require an add toroid high schools in some states require an add toroid high school such activities and the such subjects and the subject of the such schools of the subject of the such as the subject of the subject o

taken enough work for your master a degree or special education will include two are special education will include two teach and also how to teach it. You can to to take some courses in the history of teach ing. Then you should study the best teach ing methods that you can find One of the hings that you will study in the best teach ing methods that you can find One of the hings that you will study in the best teach ing methods that you can find One of the hings that you will study in the past teach that site to conserve such your pupils will be studying Nou will learn about their curricular that is the course which your pupils will be studying Nou will even practice teach as a little with special practice classes of a little with special practice classes of an active where there are good facilities for you to teach students for then your first work with



Cou es
R verdale Country Scho
A visit to the Museu
of Science and Indust
by a class in science



Flore e Marin L ncoln Sc ool "Putting on a play" de relope ski s and porides thrills

children will take place under the gu dance of experts. That is the best way for a beginner to learn to teach

It would not be a good idea for me to talk to you about methods of teach ing for many of these methods may have changed by the time you are ready to use them A great deal of experimenting is going on today in an at tempt to find better methods Right now the find better methods Right now a start of the s

citing They are bound to be of great help to you when you study this subject

Where will 500 go to learn how to teach? Teachers college? Formal school? Or a spe call department of education in a college or university? The best aduce! I can give you is make every effort to pick the one that is bell you choose it and to will the principal of your school. You will probably send for many catalogs and read them too before making your choice. Remember that the chief thing you are after is to get the neces sary tools for your job and you can not be "You will also have to prepare yourself for You will also have to prepare yourself for You will also have to prepare yourself for You will also have to prepare yourself for

the subject you want to teach Suppose you plan to teach chemistry Then you will have to learn a great deal about the field of chemistry and also about all the other fields of science that are related to it.

All of these studes are a part of your speca electation. Your general doutation will cover a great deal more ground Do you know who. Well image net that you are about to teach a class me chemistry on your wellyou to tell your pupils a little something about the subject. Wouldn't it be just too bad if you couldn't not express yourself gram matically and forcefully? And if you knew rothing about the battory of the world you could not powelby tell your pupils how the feefful story.

Do you think your pupils will respect you if you know nothing about great books and great art and great music. I am afraid they will not They will be studying about these things at the same time that they are study ing chemistry and they will expect you to know something about them. Another thing that a good general education should teach that a good general education should teach they are the study of the study of the study of the study will be very valuable to you both in the classroom and out of it.

"What a pob to learn all that you will as you will us fun! And I'd study a lutte of every list fun! And I'd study a lutte of every list fun! And I'd study a lutte of every list fun! And I'd study a lutte of every list fun! And I'd study a lutte of every list fun! And I'd study a lutte of every list fun! And I'd study a lutte of every list fun! And you will master your special subject as well The reality wase man as great deal about zone one thong That is what the good teacher mast do it subtest the source one thong That is what the good teacher mast do its substate they and the great deal about zone one thong That is what the good teacher mast do its substate they are to exceed the substate they are the substate the substate they are the substate the substate the substate the substate the substate they are the substate the substa

#### A TEACHER WITH A HOBBY IS A BETTER TEACHER

Things you learn outside of classes can make you a better teacher II you are making airplane models you need not feel ashamed of yourself for wasting your time. You can have all the hobbies you want. And every game you learn to play well will make you a better teacher. It would be a good idea to be a consideration of the play will respect you more if they know you have made a collect team.

Learn to play a musical instrument and work until you can paint a good picture and you will have opened wide the doors into two very wonderful fields Act in plays and write them Travel the whole world over Perhaps you can not do all of these things but every one of them that you do will make you a better teacher

#### HOW MUCH MONEY MAY THE HIGH SCHOOL TEACHER EXPECT?

Now what will you be paid for all this preparation if you do become a good teach er? In some parts of the country only \$100 to \$150 a month A good mechanic can make more In other parts of the country and in the best schools you may make up to \$500 or \$400 a month but such jobs are not abundant

However people are beginning to realize the need for good high school teachers and so I think that the pay is soon going to be better Better teachers will surely get better pay I believe that high school teachers will soon ment the respect that used to be given only to college faculties in days gone by The high school has and will keep on hav

ing the fun of general education and of general knowledge. The high school teacher will have to become a wiser and wiser man or woman without ever losing the joy and en thussasm of youth He will live a full and rounded life in an age that is becoming daily more limited and specialized.

One of our youing novelsts once wrote When I took up writing the high school lost a mighty fine teacher. That young novelst has never written anything ever Janusus since I always wondered why he did not stay in high school and write his novels in he vacation periods. Why didn't he keep his hife full of the poy and adventure of youth-I I think he could still be writing a fine novel every year or two if he had.

For I don't know of a richer life if one cares to make it so than the life of a good high school teacher Not in money no. But even there it is he does a good job he will have little reason to complain People will ask him to do things outside of his regular school work, and pay him well. They will offer him more special prizes than he can accept. And he can use his summers to increase his in come in any way he likes.

It was a high school teacher who with his own enthissasm and on his own two feet worked out the jungle route through Central American that the All American Highwa) now follows while some of his teacher frends may have stayed at home all summer long. We each order our own adventure according to our dream



# SCANNING THE

## TELEVISION HORIZON

By Peter C Goldmark

Columbia Broadcasting System

MORE has been discovered in the last four years that can now be apple to the improvement of television than would ordinarily have been ach eved in ten or fit teen years of peacetime development. This speedy progress of course was the result of having so many scientists and technicians at work together on the common job of win ning the war. Under normal conditions these men would have been working separately men would have been working separately by the control of the cetain extent. By the some of the control of the cetain extent.

The standard television picture before the wire was made up of 235 horizontal lines that filled the screen from top to bottom. These lines varying in light and shade were fine enough and close enough together to produce a reasonably clear picture. Never theless they could be seen as lines much more easily than you can see the tmy dots that make up the pictures in this book. The standard television screen was a little larger.



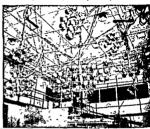
hore—An interested group enjoys a telecast on a two receiver Below—Part of the above receiver is it away to show the intricate wiring

than this page turned sidewise. It was not large enough to be seen comfortably by more than one or two people at a time. Larger screens meant more space between the I nes

and the result of that was blurred pictures. In the near future we shall have televison pictures that are made up of approximately 1 ooo lines. That means that the pictures will contain about twice as much de-

tail of light and shade as the pictures we had before the war. The lines will be so fine and drawn so closely tiggether that your eye won t be able to detect them. Moreover it will be possible to enlarge these pictures to at least eighteen inches in height before the lines become as widely separated as they

megacycles II these changes had come about under normal peacetime conditions they might have caused a great deal of trouble, for the sets and transmitters that were used in pre war television can not receive or send the new pictures. Luckily from that point of view, the war put a stop to the manufac



Right-A television studio has many lights. They are adjustable to give perfect illumination for programs.



Left-A television camera is fo cased on the program At least two of these movable comers; are in action during all belocating.

were in the smaller present screens. The patures, in short, will be as high in technical quality as the best home movies To get these twice as good pictures, tele-

To get these twice as good pictures, television has had to 'move upstairs' in the radio spectrum, into the ultra high frequencies. It has also had to increase its band widths of transmission from six to sixteen ture and sale of all civilian television while ment As a result, only nine transmitters and fewer than 7,000 rapidly aging sets are being made obsolete through the discoveries of wartime electronic research

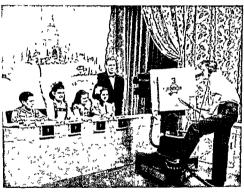
Television in full and natural color is also possible in the ultra high frequencies and wide bands of transmission, and will be demonstrated at the same time as the improved black, and white pictures. Color television, contrary to popular belief, is not new It was successfully demonstrated by the Columbia Broadcasting System more than five years ago. Among the relatively few people who saw them, a majority thought that the color pictures were superior to the black and present the color pictures were superior to the black and color than time. The more color which we have the color picture when the picture were included to the color pictures were superior to the black and the best technicolor or color illustrations in the best technicolor or color illustrations in

So far television has been seen in and around only a few scattered cities—New York Chicago, Los Angeles Philadelphia and Schenectady Television signals unlike

books and magazines

ten years, as many people in the United States will be able to see television programs as can hear radio today

We do not yet know the exact method by which television networks will grow Two possibilities have already been tested and have proved practical One is to cannect tele vision stations to each other by special cable called coaxial cable, just as radio stations are tied together by telephone wire Coaxial cable however is very evenesive. The thou sands of miles of it which would be needed for a nation wide network would cost many offer the control of the c



A typical studie television scene is caught as the camera focuses for a close-up of the "Telefruth" sid expert

tado, travel only as far from the transmit er as the horizon That is very other transation of the horizon that is very other transations and the horizon of the transaction of a possible within the communities high superior of the horizon of the horizon of the year.—On top of akyscrapers in New York, or mountain tops near Schenectady and Los Angeles Eventually, of course, we shall have television networks. Almost certainly within such station, for example has been built between Schenectady and New York and an other between New York and Washington Through these two relay points program originating in one city can be picked up and broadcast to tweens in all three citles Coast to coast relaying however, would reoure nearly too such stations. A third and most promising possibility was recently announced by the Westing house Electric Corporation This is to install televis on transmitters in specially designed airplanes that will serve as relay stations

To understand what this new plan is all about you might think of a ball being thrown down a long line of people. The first man in I ne tosses the ball. The next man in lent coses the ball. The next man catches it and throws it along. The idea is sumply to receive it and send it on That is just what these special planes will do with televis on programs. Enough of these planes flying many m les apart could send a television program from coast to coast.

Suppose a program is taking place in a television studio. How does this program reach the first of the special planes? The called a ground to plane it ransmitter and broadcast—or you might say telecast if you like that word better. The program is then picked up by a ground link receiver in the plane. Then it is fed into the planes broad program and pass as a fed in the planes are the plane. The plane is found to the plane is produced in the next plane will pick up the program and pass it along in the same manner.

The plan is to have these airplanes fly in continuous relays at 3000 of et over the areas they serve From high alittudes of course the horizon is greatly setended and a single transmitter could cover approximately 10000 os quare miles An airplane flying at 3000 feet over Pittsburgh for example could cover an area extend in from Columbus, Ohio to Washington D C Th's stratowison method has yet to be tested.



An engineer and his sound-control foom instruments



Loading Sim into the projection camera for a retelecast over Station WNBT New York.

in practice and to be approved by govern

International television is still a long way abread It probably will not be with us until after we have built a nation wide network and millions of us have television receivers in our homes. However there is no doubt that television programs can be sent from nation to nation and across occass. They are nation to nation and across occass. They are not to the contract of the contraction of th

Television programs will soon be better than they have ever been Cameramen will not be as dependent on lighting conditions as they were before the war been proposed to the state of the st

Some day regardless of where we live we shall be able to see in our homes most of the bg news events that occur in this country and many that take place abroad We shall



A Brooklyn Dodger baseball game is shown before the cameres in a telecast from Ebbets Field Brooklyn New York

be able to follow national political cam paigns from nominations to inaugurations We shall be drawn closer to our own law makers and to the foremost men and women of other countries

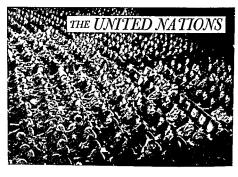
The possibilities of television in education are very great. In training millions of young men for various duties in the armed forces educators and psychologists learned a great deal about visual education. Much of what they learned can be applied through television in our schools and colleges. Much of what students now read in textbooks or hear in lectures can soon be seen in the classroom by means of television An art class in Ne braska or Alberta for example will be able to see great paintings in their true colors whether they hang in Washington's Na tional Gallery or in New York's Metropoli tan Museum or in The Art Gallery of Can ada m Toronto Medical students will be able to watch a master surgeon operating in a hospital many miles away Small high

schools will have famous college professors

and scientists on their television faculties It is generally assumed that television like radio will be midely used in advertising in the United States Broadcasters alone could not support the tremendous cost of network maintenance and programs. Very little television advertising has yet been seen but many who have seen it speak of its ability to show how a product is used as well as to show its appearance. This is especially true in the case of color television In time and if properly used television may

Before the war television pictures and programs were not good enough to interest many people. But now television will make a fresh start based on the improvements it has inherited from wartime research. It is inoped that television will soon more for ward to become a major American industrione that will engage the working hours of thousands and enrich the lessure hours of millions.

become the most valuable form of advertis



## By Vera Micheles Dean Foreign Policy Association

EARLA in World War II, the nations that were ranged against the Aus because known as the United Nations As the asperad, more and more nations joined their ranks until, when the war ended with the unconditional surrender of Japan, the number of the United Nations had reached a total of more than fitty

All continents, all climates and all taces of mankind are found among the United Nations Their people live in places as unable as you can imagine, from the jungles of Africa to the great cities of western Europe and North America Some have great wealth and some are as poor as they can be These many millions of people make their living in all kinds of different ways

There is the same wide variety in their eligious beliefs and in their ideas of government. The United Nations include democracies and dictatorships, monarchies and republics. There are states—such as ours where the railroads and telephone lines and banks and mines are owned and managed by individuals or private corporations. We call this system free enterprise. In other states among the United Nations, the governments own and manage the banks and mines and railroads, and so on. We call this system socialism.

But all these many nations, so different from one another, had one compelling aim in common. They were grimly determined to survive by defeating the efforts of Germans and Japan to enslave them.

As long as they were faced with the press ing danger of defeat, the United Nations spared no effort to help each other against a common foe. Britain and the United States supplied naval power and so, to a lesser de gree, did other countries—notably Norway and the Netherlands Britain and the United States furmished most of the air power Rus sia and the United States, with their great populations, gave the bulk of the land armes

The United States, because of its enor mous industrial resources, was the arsenal of the United Nations It furnished a tremen dous flood of munitions, guns, tanks, air planes and other war equipment Britain and Canada, too, made war equipment for the United Nations Britain and Australia served as bases from which the campaigns were

launched that ended in the defeat of Germany and Japan Belgium, France, the Netherlands and Britain placed the raw ma terials of their colonies at the disposal of the United Nations Other vital raw materials were furnished by countries of Latin America Tin, for instance, was furnished by Bo livia, rubber, by Brazil Resistance groups in all European countries aided the common cause Such groups, because they worked in secret, were known as the Underground The brave men, women and children of the Underground prevented Hitler from establish ing complete control over the Continent, and helped to prepare the way for Allied invasion In the Philippines, guerrillas, hidden from the Japanese, snatched at every chance to kill or sabotage the enemy Soldiers, sailors and airmen of the United Nations fought bravely side by side, some in the steaming jungles of Burma and on the Pacific Isles. some in the deserts of Africa and others in the hedgerows of Normandy. On all the seven seas as well as in the air above all theaters of war, they proved their courage and their

#### FACED WITH THE DANGER OF DESTRUCTION MANY NATIONS FOUGHT AS ONE

comradeship

In this common struggle the interests of the United Nations became clovely interwoven People in danger of destruction have hitle time to think of national prestige or of saving face Americans, British, Canadians, Peetchmen and others fought against the command of an American Leader, General Eastabover Similarly, Americans, British, Chinese, Indians and others fought as one great force in southeast Asia under the command of a British leader, Admiral Lord

Mountbatten
The United Nations pooled their resources
of raw materials, food, manufactured goods
and ships, and distributed these where they
were most urgently needed. This was an
enormous task It was carried out through
the Combined Boards in Washington, of
which the Villeck States and Writems were

the most important members. Another tremendous task was that of working out together the strategic plan of the war. This was done through the Combined Chiefs of Staff of the United States and Britain, who worked clovely with the military leaders of the other United Nations Sigh remarkable team work, on so buge a stale, had never before been known. Not one of the United Nations of the Original Staff of the Staff of the

team work that made it possible for them to

defeat Germany and Japan We all know, however, that military vic tory is not enough. If the partnership built up by the United Autons in wartime should fall apart, the Germans and Japanese might recover their strength at some future date. They might once more catch us off guard if we and our allies are no longer united. How we and our allies are no longer united How coperative we so effectively developed in time of war?

#### COULD THESE NATIONS WORK TOGETHER IN PEACE AS IN WAR?

This question was being studied by President Rosseld and Prime Minister Churchill long before the war was over in order to find an answer to the question they, and other Allied leaders decided to create a number of international agencies in which the United Nations would begin to prepare for the enormous problems of peoce in the grim years a Pen Victory seemed still tragerilly destant, the United Nations held a series of conferences. It was their business to conference in the grim which nations might co-operate darfer the var

The Food Conference at Hot Springs Vir ginia, established the Food and Agriculture

Organization in 1943
The United Nations Rehef and Rehabili tation Conference at Atlantic City, New Jersey, set up the United Nations Relief and Rehabilitation Administration in 1943

An Allied conference on education was held in London in April 1944 The Monetary and Financial Conference at Bretton Woods, New Hampshire, laid plans for an International Monetary Lund

and an International Bank in July, 1944
A civil assistion conference in Chicago established an international civil assistion board

in November December, 1944.
All these agencies deit with special, technical questions, and could not be expected by themselves to insure co-operation among the function hashing over a long perfect of the first and the second country and the fitted into a wide international organization that could offer a measure of mitigary security and economic stability to all nations, large and small. Plans for such an international organization and second the second country and common stability to all nations, large and small. Plans for such an international organization were officially inertion.

States, Britain and Russia in 1943.

near Washington, D. C., A. 7, 1944, refreentatives

#### THE UNITED NATIONS

Representatives of the following nations signed the Charter of the United Nations Organization in San Francisco U S A June 26 1945

THE BIG PIVE China Union of Soviet Socialist

Republics United Kingdom United States of America France

Argentina Australia Belgium Bolivia Brazil

Byelorussian Soviet Socialist Republic (White Russia)

Canada Chile Colombia Costa Rica

Czechoslovakia Denmark Dominican Republic Ecuador Egypt El Salvador Ethiopia Greece

Cuba

Guatemala Haiti Honduras India

Itan Irao Lebanon Liberia

uxemburg Mexico

Nicaragua Norway Panama Paraguay Philippine Common

wealth Poland \* Saudi Arabia Syria

Netherlands

New Zealand

Turkey Ukrainian Soviet Social

ist Republic Union of South Africa Uruguay Venezuela Yugoslavia

\* Poland signed the Charter on October 15, 1945

-the United States Britain Russia and China-drew up proposals for a United \a tions organization

An important gap left in the Dumbarton Oaks proposals concerned the way in which the Security Council of this organization would vote This gap was filled in at the Valta Conference February 4 12 1945 At Valta in the Crimea were President Roose velt I rime Minister Churchill and Marshal Stalin Shortly after this meeting representatives of the United States and of nineteen Latin American countries met in Mexico City Argentina alone of the American republics was not represented At this meeting I ebruary 21 to March 8 1945 the Act of Chapultenec was adopted This agreement provided for the defense of the Western Hemisphere in time of war It is expected that many such regional agreements will be reached in the future Finally, fifty of the United Nations (see box) gathered at the San I rancisco Conference April 25 June 26 1945 to consider the Dumbarton Oaks proposals It was necessary to change these proposals so that they would fit into the general scheme of the Act of Chapultepec and regional security agreements which Rus sia had made with Britain France Poland Czechoslovakia and Yugoslavia At the close of the San Francisco Conference representa tives of the nations present signed the charter of the United Nations Organization The charter is accompanied by the statute of the

International Court of Justice

The United Nations Organization is known for short as UNO It consists of the General Assembly the Security Council the Trusteeship Council the Secretariat and the International Court of Justice

In the General Assembly all nations large and small have an equal voice The General Assembly is intended to serve as a town meeting for the United Nations, where all can say what they think It is to meet at least once a year, and more often if necessary

On the Security Council sit representatives of eleven member nations The United States Britain Russia, France and China are permanent members. The other six mem bers are to be chosen for terms of two years each by the General Assembly

In 1945, UNO had not yet chosen the city where its meetings will be held. The place which it finally chooses will also be the home of the Security Council A representative of each of its eleven member nations must al ways be there, so that the Security Council will be able to hold its meetings and do its work every day, year in year out

The great purpose of the Security Council is to maintain international peace and to take steps against any nation that threatens the peace. Its decisions can be questioned in the General Assembly by any of the United Nations But their discussions can not pre vent the Security Council from taking prompt action in an emergency

In its difficult task of maintaining peace the Security Council will be aided by a Mili tary Staff Committee Each nation member of UNO undertakes to tell the Council what armed forces and facilities it will place at the Council's disposal Each member will supply air force groups to the Security Council so that the Council may be able to act promptly against an attacking country

#### WHAT IS THE BIG FIVE S VETO POWER? WHY IS IT IMPORTANT?

The Security Council will be able to use these planes and other military forces on one condition only-when all five of the great powers agree that they be used One of the rules of the Security Council is tha each great power has the right to veto-that is to forbid-the use of force in maintaining peace Therefore no effective action can be taken against an aggressor without the con sent of the Big Five This right of veto is the weakest spot in the United Nations Organi zation Either the United States or Britain or Russia or China or France may by its veto prevent the Security Council from taking action

The Economic and Social Council is re sponsible to the General Assembly It will deal with the prosperity and the welfare of people in all nations. It may become as im portant in its field as the Security Council will be in keeping the world safe from an The various United Nations aggressor agencies which we have already discussed and others that may be created in the future are to be fitted into the Economic and Social Council This Council is to be composed of representatives of eighteen nations chosen without considering their mil tary or indus trial strength and it is in this Council that the small nations can make a most valuable

contribution to the work of UNO another important organ which is also re sponsible to the General Assembly is the Trusteeship Council In the San Francisco Charter, the United Nations agreed to ad vance the welfare of dependent peoples and to promote their 'progressive development toward self government or independence UNO may act as guardian not only for ter titories taken from Germany Italy and Ja pan as a result of the war but also for colonies now controlled by the United \a The administration of any territory placed in trust with UNO will be supervised by the General Assembly through the Trus treship Council On the other hand the development of any part of such a territory

designated as strategic will be supervised by the Security Council

The Secretariat will supply the people and the facilities to operate all the various parts of UNO and will carry out their technical work. The Secretariat is to be headed by the Secretary General of UNO The Interna tional Court of Justice will consider disputes

voluntarily brought before it by nations The charter was s gned by the representa tives of fifty nations on June 26 1945 Then one more step was necessary. To bring the charter into force it had to be ratified by

twenty n ne nations

The United States was the first of the powers to accept the San Francisco Charter On July 28 the Senate ratified the document by a vote of 89 to 2 This was a remarkable contrast to the refusal of the United States in 1919 to join the League of Nations

The twenty ninth nation ratif ed the char ter on October 24 1945 and the charter became a part of the law of nations The twenty ninth ratification was that of the Union of Soviet Socialist Republics

The UNO is an experiment Whether or not it works will depend on all of its member nations But if we co-operate with each other, we can strengthen the web of our mutual interests Co operation will some day prove to be a greater safeguard against war than the most costly armaments



Co-operation English children send food to Europe

# UNITED STATES

WORLD WAR II is now at an end in the year cogs the Intel States and its allies dealt the Asia a series of simashing blooss that forced first Germany and then Japan to give up the fight May 8 was V Buy—the day of vetry over the fermans in Europe The Japanees surrendered on September I United States time. This corresponds to the states time This corresponds to the states time. This corresponds to the state time. This corresponds to the state time This corresponds to the state of the

The armed forces of the United States played an important part in bringing about the final defeat of the Axis powers American bombers and pursuit planes joined the Brit ish Royal. Air Force in bringing destruction to the industries and the transpriation system of Germany American armies took part

in the final assault on the nazi fortress See the article on Furope

The contribution of the United States to the defect of Japan was greater than that of any other nation. American land forces won all important bases on the Islands that nigged Japan is empire. American mind and air poner was chelly responsible for driving the once mighty. Japanese navi. from the seas. The fearful air bombung of Japan is home islands was almost entirely the work of American Diane.

Many scientists—British Canadian French German and Danish as well as American—contributed directly or indirectly to the development of the atomic bomb \text{\text{te}} the tit was the United States which made it a practical weapon—a weapon that destroyed the Japanese will to resist almost in a day See the articles on Asia and on Atomic

Frenzy
Tressdent Franklin D Roosevelit the great
wartume leader of the United States did not
two to see the final day of votcoy He dnel
suddenly on April 12, 1945, at Warm
Springs Georgia and was succeeded by ViceFresident Harry S Truman Roosevelts the
death had hitle on no effect on the outcome
of the war, since no ne flect on the outcome
of the war, since the success of the control on his
that the man who had led the country so far
along the road of victory should due less
than a month before V E Day

Modern warfare is not carried on entirely on the feld of battle. It is also waged in the factories which turn out the supplies of war ships tanks guns ammunition—without

which a great army would be a helpless mob The United States which is the most highly industrialized country in the world played the leading part in this war behind the lines

America's war production was almost un behe sably great Chairman J. A Krug of the War Production Board recealed in October 1945 that in five years America had made 97 000 bombers and 200 000 other military planes 71 000 warships 80,388 tanks 2 435 000 trucks 17,400 000 rilles and sidearms 41,000 000 000 rounds of small arms ammunition and 43 270 000 000 bolb hikels

The United Stries was able to equip its own vast arms; and also fo ship supplies under Lend I ease to its allies. In a report issued toward the end of August President Truman announced that up to July 1945; the Linted States had supplied its allies with \$42 809,387 000 worth of goods on Jenual Heave terms. Great Britan had received the loos above 1942 of the Linted States 1942 of

America's allies contributed to ber needs under reverse Lend Lease in the form of barracks airfields offices, places of recreation food and so on Up to July 1945, the United States had received \$,600,364 coo worth of reverse Lend Lease Most of this was supplied by Great Britain and het dominons of Australia and New Zealand

Of all the chief partners in the struggle against the Avis the United States alone escaped the destruction that makes modern war so terrible. Her cities were not bombed her fields were not laid waste her industrial plants remained lintact.

Net if the horrors of war were not carried to America soul the constant fighting all over the world took a heavy toll of American fighting men A report Issued in October 1945 listed the Armys causalties at 927 533 (By casualties we mean men lost to the fighting services because they have been

killed wounded captured or sick or because they are missing ) Navy losses in the same period amounted to 145570. The total American casualties were about three times those suffered in World War I

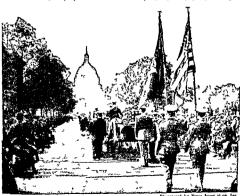
The financial cost of the war to the United States has been staggering By V J Day the United States had spent on war a total of \$289 15 roo ooo—far more than any other country had ever spent for this purpose. But thus amount does not represent the total cost of the war to the United States In the years to come many more billions will have to be spent on persons for generic more or described by the spent of the property of the

After the fighting was over, the victorious affices faced the problem of rebuilding a shattered world First of all it would be necessary to feed the hungry and give shelter to the homeless. The principal part in this work

of charit, has been played by the United Nations Relief and Rehabilitation Adminis tration (UVRRA) an organization composed of forty four members of the United Nations The United States has contributed almost three-quarters of the total funds of UNRRA A pamerican Herbert H Jehman

is the director general of the organization. While UNRA provided valuable help in the form of immediate relief at could not solve other problems brought about by the most terrible war in all history. It would be most terrible war in all history. It would be mocessary to build new houses factories and merchant ships to replace those destroyed in the war. It would be necessary to restore wreeked transportation systems. It would be necessary to provide new farm equipment and new equipment for oil fields. The nations of the world looked for help to the United States which had suffered least from the transers of war.

America made it clear that she was willing to do her share in helping to bring back world pro perity. In July 1944 delegates



Photograph by Press Assoc at on Inc Bearing the fing-draped comin of President Rodsevelt toward the Capitol, on route to the White House services.

from forty, nations had signed an agreement called the Brettom Woods Monetary Plan II, proposed to set up a special fund to support the currences of needy countries II also provided for an international bank which would lend money, for reconstruction work on regions laid waste by the war II plan which was the provided for an international bank which is not to be supported to the provided of the provided by the plan When I resident Truman spried the measure on August 4 the Linted States became the first country to take off cril action on the proposal.

#### SHORTLY AFTER THE WAR'S CLOSE IT WAS ANNOUNCED THAT LEND LEASE WOULD END

Some members of the Linted Nations expected that they would continue to receive len I leve supplies after the end of the war-But on Yugust 21 1043. Fresident Truman announced that steps w uld be taken at race to discontinue all lend lease operations and to notify foreign governments receiving Lend Lease of this act on

Great Bratam protested strongly other countries also expressed their fear of the ton-equences. But IT-resident Truman made, it clear that Lend Lease was definitely at an end. He pointed out that the Linted States was will got help its partners among the Linted Nations with substantial sums in order to bring lack prosperity to erch and every one. But these sums would be granted only in the form of loans.

A sety, del cate question in connection with Lend Less has always been. Would the countries receiving supplies be requested to pay for them at some future time fortunately the original Lend Lesse Act. d.d. not deal clearly with his matter. In a report sent to Congress on August 30. 1045. I resident Truman warned the United States not to expect payment for the great bulk of the lend leave supplies shipped to our alliers.

If we anosted on full parament for these terms said the I reas lent we would upeet the I nancrul structure of these allies and we might well lay the foundation for a third worll wir. The Presidents termarks were not I avorably received by Congress Secretary of State Byrnes hastened to print out that the President had not set up a policy but had made only a suggestion.

The United States has taken a prominent part in the effort to bring about world peace through a new league of nations—the United Nations Organization (UNO). A definite plant for this world union was prepared at the Dumbarton Oaks Estate near Washing.

ton D C in August September, 1944 Del egates from fifty nations signed the perma nent charter of the UNO at San Francisco on June 26 1945 See the United Nations and World Peace

The end of the war found the United States with by far the bugest military machine in its history. The Army numbered Results are supported in the first factor of the first factor of the first factor of the first factor with the field. Of course this huge force which was necessary to fight an all-out war, was far greater than would be required to guard the foundry in time of peace. Therefore after country in time of peace Therefore after factor of the first facto

This was based on (1) the length of time

in service (2) the length of time overseas (3) certa in Georations won in service (4) the number of dependents It is estimated that the Army discharged 2,000 come nbetween V. E. Day, and the end of 1035. \*\*House of 6000 com will be released by July 1 1946. \*\*On V. J. Day the United States Navy was J. Sin the largest in the world It numbered by J. Sin the largest in the world It numbered 1000 companies of the properties of the Navy Forrestal announced that the Navy meant to reduce its numbers to a peacet me

strength of 550 000 including 50 000 officers

It was planned to keep about a thousand
combat shape with supporting aircraft and
supply reselfs One third of the fleet was in
be kepf fully nanned and retayl for any
overgreey. One third was to be held in the
overgreey. One third was to be held in the
overgreey. One third was to be held in the
overgreey. One third was to be a supply
one third was to be taken out of act ve serviree but would be available for service at
some future time if needed

#### THE ARMY AIR FORCES SHOWED AN INCREASE OF OVER 3000 PER CENT DURING THE WAY

On V J Day the Army Air Forces (AVF) numbered 2 500 000 men and women an in crease of more thin \$500 per cent since the United States entered the war in Deember 1941. It was planned to cut the AF to about 900 000 1 y July 1 1916. After that time the figure would be reduced at Il further probably to about 700,000.

On November 20 1945 President Troman announced a change in the leadership of both the Army and the Navy General of the Army George C. Marshall Army ched of staff and Fleet Admiral Ernest J. king ched of sayal operations had sent in their ched of sayal operations had sent in their

resignations General Marshall was replaced by General of the Army Dwight D Eisen hower the successor of Admiral Ling was Fleet Admiral Chester W Nimitz

To provide necessary replacements for the armed services it was planned to continue the draft of men between the ages of eight even and itsently sax for some time to come in October, 1945. President Truman urged Congress to pass a law setting up a perma nent peacetime draft. He recommended that young men between the ages of eighteen and twenty should be required to undergo a years military training. They, would then become members of the general reserve for a period of six years. Congress had not acted on the Prevident's suggestion by the end of 1945.

#### THE PROPOSAL TO UNIFY THE ARMED FORCES BRINGS FORTH MANY DIFFERENT OPINIONS

Another important military matter that came up for discussion after the end of the war was the question of unting America's armed services under a single head. In October 1945, the War Department offered a unification plan to the Senate Military Affairs Committee Under this plan the Army Navy and Air Forces would be placed under a single civil an Secretary of the Armed Forces Them would also be a Chief of Staff of the Armed Forces he would also be a Chief of Staff of the Armed Forces he would also be a Chief of staff of the Armed Forces he would also be a Chief of Staff of the Secretary

The Navy was buferly opposed to the War Department sunfication plan Secretary of the Navy Forrestal maintained that the rivalry between the services was a healthy one and should be kept. Toward the which he said would bring about; real unfication of the armed forces. The Forrestal plan provided for a permanent nat onal security council made up of the President the Secretares of State of War and of the Navy and the chairman of a new national rethe chairman of the security council.

Those in favor of unification claimed that lack of co-operation between the Army and Navy had been chiefly respons ble for the heavy losses suffered on December 7, 1941 when the Japanese attacked Pearl Harbor In November 1945 a congressional committee began a thorough investigation of the mode to the committee was committee to the committee was made to the committee was committee with the committee was committee to the committee was committee with the committee was committeed with the committee was committee with the committee with the committee with the committee wi

It is d flicult to set up a definite military



hard hitting new destroyer slides down the ways in wartims launching It joins the world's biggest navy

policy for the future because the atomic bomb threatens to change all accepted deas about warfare. The striking power of this new weapon is so great that a single surprise attack might cripple the mightiest nation for tally in a few hours. It is true that at present the United States alone has the secret of manufacture ing the bomb But those who know most about the matter claim that other nations will have atomic bomb in five years.



Courtesy \st onal B and sat ng Lo spars General of the Army Dwight D Eisenhower on his re turn to Washington D C weves to the crowds

or perhaps even in a shorter time Some people think that the Linted States should belp quiet the fears of the world by sharing its secret below the transport of the people feel that this considerations Other he atomic bonds a secret register of the and that research in atomic energy solid and that research in atomic energy solid be strictly controlled in the mitered of tomal defense. Such was the aim of the May Johnson Bill introduced into Congress in October, 1945. Thus far, no action has been taken on the measure

Great Britain and Canada have been closely associated with the United States in the development of the atomic bomb British and Canadana scenistis worked on the project in the United States States of the United States and a south as world as greatest able the Great Bear Lake Grossis of pitch blende This is one of the world as greatest stores of uranium bearing over—the one from which atomic energy is derived at the present time.

In November, 1945, Prime Minister Attlee of Great Britain and Prime Minister Mackenzie King of Canada went to Wash ington in order to discuss with President Truman the future of the atomic bomb The three statesmen usued a joint statement in which they recommended (1) that the secret of the bomb should be kept by the United States for the present (2) that steps should be taken by the United Nations Organization to outlaw the use of atomic energy in warfare and to promote its use for peaceful purposes

The year 1945 was one of the most critical in the history of American industry. It was a year in which the country had to change from a wartime to a peacetime basis Thoughtful people had realized that this task of reconversion or changing over, would be a difficult one It would take time for war industries to turn to the manufacture of ci vilian goods and during this period many people would be without work Veterans re turning to civilian life would add to the number of the unemployed Again the eas ing of wartime controls over prices and wages might lead to runaway inflation. How did the country meet these problems in 1945?

As the year opened the country was in the most of the war effort. We have already told you of America was the should yet when the first means and fore far belond. Yet it is currous to note that in the early months of 1043, the United States faced a serious man power shortage in certain industries. A number of workers had left their war jobs for jobs in civilian industry because they thought the war would be over soon Others had become discouraged because of hours of transportation difficulties.

#### LABOR PROBLEMS IN ESSENTIAL INDUSTRIES BRING FORTH NEW PROPOSALS IN CONGRESS

In an effort to provide enough workers for essential was work, the Roseevelt Admins tration tried to push a labor draft bill—the May Bailey Bill—through Congress The House passed the measure in February, but the Senate Committee on Miltary Affairs refused to bring it to the floor of the Senate Formation of the Senate of the Senate of Our Senate of the Senate of the Senate of Our Senate of the Senate of the Senate for Our Senate of the Senate of the Senate of Our Senate of the Senate of the Senate of Our Senate of the Senate of the Senate of Our Senate of Senate of Senate of Senate of Senate for Senate of Sena

While certain industries were desperately searching for workers, in other industries there were a number of cutbacks—that is reductions in original schedules On March 27 the Navy announced that seventy two combat ships had been cut from the naval building program of eighty four announced

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on March 6 There were also cutbacks in the manufacture of ammunition tanks small arms and powder As a result a number of workers lost their jobs.

The industrial picture changed suddenly after VE Day even though the war against Japan had not yet been won Cutbacks in creased by leaps and bounds so dd the number of unemployed Industries that had hitherto been prosperious found themselves without the war orders on which their prosperity had been based Soon the country found uself plunged in the difficulties of the reconversion picture.

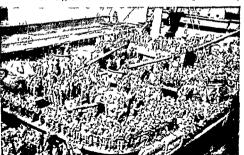
Certain steps had been taken before V E
Day to prepare for the coming of reconver
son Congress had safeguarded veterans re
turning to civilian life by passing in June
1944 a bill known as the GI Bill of Rights
(GI is a war slang term meaning an ordinary
soldner) This measure provided free school
ing a year's unemployment compensation
Retrous boans and other benefits to veter

ans
In October, 1944 an Office of War Yobi
lization and Reconversion had been set up
m order to supervise the entire reconversion
program At the same time a three man Sur
plus Property Board had been created no
order to dispose of the billions of dollars
worth of unused war supplies that woulds

on hand when the end of the war came. In March, 1945 three leaders of labor and industry, had met at Washington in or der to discuss the labor situation in the reconversion period. These men were Presi dent Will am Green of the American Federa on of Labor President Philip Murray of the Congress of Industrial Organizations and President Price A Johnston of the United States Chamber of Commerce They drew up a seven point charter which aimed to bring about a new era of peace and hatmony in the field of labor relations. The charter guaranteed collective bargaining high wages and the rights of private property under the system of capitalism.

The War Production Board promised that twould release needed materials for the use of civilian industry with the coming of peace—perhaps even before that time if possible The Office of Price Administration promised to do away with the complicated system of rationing as soon as possible

All these measures represented at least the beginnings of a return to peacetime ways of living Net much had been left undone. What is of unemployment? War workers losing their jobs would be entitled to unemployment compensating usen by the states. But the various state systems differed widely in some states the amounts granted were very



Tres Asser & see Jan

Petersa soldiers of the African and Italian campaigns approve their banacoming joy as they deck at Now York.

small In 1944 President Roosevelt had backed a bill providing for adequate compensation to the unemployed for a period of six months. Congress had refused to pass the measure

Nothing had been done either to et up a wage policy for the reconversion period During the war workers in defense india a wage policy for the reconversion period During the war workers in civilian industries had workers in civilian industries had worked forty eight hours a week on an average with pay and a half for overtime after forty hours. With the coming of peace there would be no overtime work in most in distries Labor leaders announced that they would seek large increases in wages in order to make the amount of take home pay about the same as hefore. Some people about the same as hefore. Some people workers and perhaps lead to romaway indiaton midston productions and perhaps lead to romaway indiaton productions.

And what of strikes? If they became wide spread they might hamper midstry sen ously in the reconversion period and both industry and labor would sufficiently and labor would sufficiently and thatch had introduced a measure providing for computing arbitration in labor disputes. Congress refused to consider this bill because the Administration organized labor and management were all opposed to:

And so the country entered upon the period of reconversion with only a partial program. The result was great confusion. As had been foreseen the unemployment prob lem became serious Half a million men and women lost their jobs in the month after V E Day The United States Employment Service (USES), a wartime agency which provided free employment service for work ets was swamped with applications for jobs

Now a curious situation arose In forme areas where the number of unemployed rose sharply many factores reported that they were desperately in need of workers and could find none There were various reasons for this Some men had worked long hours for high wages in war industries they felt that they needed a rest and they could afford to take one Some of the jobs that could not one to the country of the policy of the country of the them. The country of th

And so cettan undustries were hampered by lack of workers in their effort to get back to peace production. Other industries were held back by strikes. Some strikes were called because workers were disastisfied with working conditions or because they wanted to have certain umon groups recognized blue strikes however were the result of wage disputes. The efforts of labor leaders to obtain large increases were met with a most of the strike the strike

Green Murray Johnston char ter was ignored in this crisis It had never been anything but a hopeful statement of principles It had never been accepted by organized labor or by industry as a whole

"Street and the street and the street and sales are s

The President now pre-



President Harry S Truman joins with high military and naval leaders inspecting the original document whi h rece ded the surrender of the 1 anese The signing took place on board the battleship Missouri is Tokyo B

sented to Congress a far reaching program which would deal with all the diff culties brought about by reconversion Among other things he proposed (c) to hold the line on prices for a time, (2) to hold wages in line where increases would lead to higher prices (3) to remove government controls where states would be able to pay the proposed of the pro

ment in the days that lay ahead (6) to pro

vide a well rounded crop insurance program Congress refused to heed the Pres dents plea for speedy action on his program. The situation continued to be serious. The nations entire industrial production was threatened in September by strikes in the vital oil and coal industries. On October 4 the President ordered the Navy to seize and operate twenty six oil producing and refin ing companies in order to get the strikers back, on their jobs. The Government would probably have taken action in the coal strike too if President John L. Lewis of the Mine Workers Union had not ordered.

the strikers back to work on October 17 GOVERNMENT POLICY ON WAGES

AND PRICES IS ANNOUNCED On October 20 the President appounced that the Government would no longer seek to control wages. He announced however that manufacturers granting wage increases would not be allowed to increase prices without government approval Price increases based on increases in wages would be per mitted only if (1) previous wage increases had not kept up with the cost of living (2) wage increases were necessary to make wage rates more or less equal among plants in the same industry or place (3) wage increases would have to be granted in order to insure full production in an essential industry. The President declared that industry as a whole could afford substantial wage increases without any general increase in the price But most manufacturers disagreed

On November 5 a labor management conference was opened in Washington in an other effort to bring about peace on the home front. There were eighteen labor delegates eighteen management delegates and three non voting government representatives. The labor delegates were drawn from the ranks of the American Federation of Labor, the Congress of Industrial Organizations and two independent union groups—the railways.



Offic al Ln ed S es Na y po g ap A television appech by Fleet Admiral Chester W N mitz

workers and the mine workers. The conference failed to bring labor and industry to gether. Serious strikes continued to endanger the entire reconversion program.

The nation's farmers were handicapped.

by unfavorable weather April frosts caused great damage in many areas floods ragge in the Unidile West Nevertheless the 1945 crop was unusually large and farmers en joyed another prosperous year The Bureau of Agricultural Economics estimated that the farmers cash income from the sale of their products amounted to over \$20.000.

000 000 in the year 1045

The problems of reconversion have af feeted all Americans—even those who have taken no direct part in the conflict between labor and molastry For one thing it has meant the easing of many controls which had been in effect during the war A number of articles had been rationed in order to as sure a lars supply to all Alter V J Day first one article and then another was taken from the ration lists. The most far reaching step in this direction has taken on November 23 ration free The only attacks that are now rationed are sugar and passenger automote the trees when the contraction of the contraction

Price controls are still in effect and will probably be applied for some time to come The Office of Price Administration (OPA) sometimes raises prices on certain items in order to encourage production but in gen are it in that time to hold the line against in flation. The OPA has received the support of organized labor but has been severely at

tacked by the country s manufacturers

In spite of price controls at seems certain that the price of food will rise as subside to (special payments) are I fted The Governe ment has been paying these subsidies to producers of agricultural or dairy products (1) to enable the farmer to make a reasonable profit and (2) to keep the prices of food ar ticles from rising

#### STOPPING AID TO FARMERS MAKES FOOD PRICES GO UP

In November 1045 the Covernment an nounced that subsidies would be readually removed between that month and June 30 reported between that month and June 30 reported between that month and June 30 reported by the litting of all subs dies. The effect of such a program was seen on November 8 when the Government removed one of the two subsidies controlling the price of butter As a result there was a rise in price of between five and styr central a pound

Toward the end of November 1984, officials of the OPA and the Department of Agraculture issued a report on the renoval of subsidies They predicted that sa a result the prices of at least thirty seven important items would increase from 10 of open centre in the prices of the seven of the seven of the milk claim of the seven of the seven of the first These metrases could be sevented only if Congress voted to restored all subsidies

The housing situation which was serious in wartime became even well after VJ Day Conditions were particularly had in the larger cities. Many of the particularly had in the larger cities. Many of the product work decided to remain after the war. Fav. which was the condition of the product of

The coming of peace has lightened the burdens of American stangers. In Novem ber 1945 Congress passed a bill provid got considerable reductions in laxes for both corporations and individuals on income for 1946 This measure will bring, about a tax cut of about \$5 000 000 000 it will remove an estimated a 1000 000 Americans from the nations tax rolls

Organized labor continued to make steady progress in 1945. The American Federation of Labor (AFL) has about 7000 000 mem bers the Congress of Industrial Organizations (CIO) 6 500 000 A large number of workers estimated at from 2 000 000 are organized in independent un

ions—that is unions not forming part of the AFL or CIO

The National Labor Relations Board (ALRB) made a important labor decision on March 1945 It announced that foremen and other 1945 It announced that foremen and other proposed for the purpose for the purpose

Another problem of deep interest to labor is that of full employment throughout the year Many industries are seasonal that is they offer employment for only part of the year Organized labor has held that this policy is unfair to workers and that they should be guaranteed a definite yearly wage Only a few industries have given south quarantees of employment it is estimated that fewer than 50 000 workers are covered by such as

agreement
On July 28 1945 the National War La
bor Board issued an order providing for a
guarantee of full employment throughout
the year for 300 shoe salesmen in New York
City This was the first order of the kind
ever issued by the board A week or so later
government investigators began a careful
study of the problem of guaranteed employ
ment This study is still under way

THERE WERE MANY CHANGES IN THE CABINET AFTER HARRY S TRUMAN BECAME PRESIDENT

There were changes in the presidential calment in 1945 On January 21 Secretary of Commerce Jesse Jones resigned at Presi on Roosevelts request The First dent then named Henry A Waltace Jones were fixed to succeed WI Jones The Senate reduction to the Communication and the confice of Secretary of monitation and the confice of Secretary for monitation and the president of the Communication of the Communication of Secretary for monitation and the president of Secretary for monitation and the Communication of the Communication of Secretary for the Secretary for the Communication of Secretary for the Secretary fo

When Mr Truman became president in April it was freely predicted that there would be alig shake up in the Cabinet This prediction was certainly fulfilled Over a perod of four months there were no less than seven Cabinet changes as follows (1) Post master General Robert E Hannegan replaced Frank C Walker (2) Attorney Gen eral Thomas C Clark replaced Francis J Biddle (3) Secretary of Agriculture Clin ton P Anderson replaced Claude R Wick, ard (4) Secretary of Labor Lews B Schwellenbach replaced Frances Perlans (5) Secretary of State James P Byrnes replaced Edward R Stettmus Jr (6) Secretary of the Treasury Fred M Vanson replaced Henry Morgenthau Jr (7) Secretary of War Robert P Patterson replaced Henry R Sturson

There were also many changes in the government agencies that had spring up during the war Some were abolished these in cluded the Smaller War Plaints Corporation (SWPC) the Office of Loronomic Stabilization (OUS) the Office of Economic Stabilization (OUS) the Office of Strategic Services (WPB) In most cases the duties of these organizations were turned over to other federal sericies.

The important National War Labor Board was attle mensience at the end of 1945 but it had changed its policies considerably. It refused to take up disputes between employers and workers unless both sides agreed to accept the board's decision. Furthermore it no longer ordered strikers to go back to

work it merely requested them to do so. There was only one change in the membership of the United States Supreme Court in 1945 On July 5. Associate Justice Over J. Roberts resigned he announced that his resignation was to take effect on July 3 Justice Roberts a Republican had been applied to the control of the country o

pointed by President Hoover in 1930 On September 18 President Truman nominated another Republican Senator Harold H Bur ton to succeed Justice Roberts The nomination was confirmed by the Senate the next

Associate Justice Robert H Jackson of the Supreme Court was named by President Truman as the chief United States counsel on the International War Crimes Tribunal a court set up by the Albes in order to try Axis war criminals Justice Jackson obtained a leave of absence from the Supreme Court in order to serve on the Tribunal This body opened its trial of accused nazi leaders on November 20 1945 After the nazi defend ants had all pleaded not guilty Justice Jack son opened the prosecution's case Claiming that the real complaining party at your bar is civilization he charged that the defend ants were responsible for the war that Hitler planned war with the United States in 1040 and that the Japanese plotted in 1939 to assassmate Josef Stalin The legal proceed ings were watched with interest due to their lack of precedent in international law

Such as the story of the United States in the year 1945. It ended on a rather doubtful note America had come through the ordeal of war with flying colors but she had not done so well in solving the problems that peace brought with it There seemed to be need of recalling to all Americans the lesson learned in the trying days of war that in

unity there is strength



Acme ph w graph g workers at a Ceneral Mory plant in laden New

ational period to the local period to the local period actions to the local period to



Ameri an panes son o e the mgb y USS M asoc as Japan sury aders forms y

A Japanese p coff al sous ed and his conque ets co d wa bulley s.





V-DAYS

Marines who began the great offensive against Japan if ten a ad a news of the wa a and Offen a U S Ma n Corps photo



[ 330 ]

## CITY CROWDS GREET VICTORY IN EUROPE



[ 331 ]



### By Gerald J. Holton

Harvard University

O UR whole universe is filled with rays, shooting past or through one another at enormous speeds Unlike sound (which needs some medium like air or water through which to move) all these various kinds of radiation can travel through quite empty space, such as the lonely vacuum between the sun and our earth. They are really an absorbing study, and a study which affects many other minacles of nature

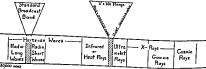
In discussing a topic of this sort which is so closely connected with many other scientific wonders, there is a possibility of mentioning allied subjects which have been toning allied subjects which have been treated elsewhere in your book. It is felt, bowever, that the great interest in rays justifies a separate and complete explanation

#### LIGHT, THE RAYS BY WHICH WE SER

The rays we know best are the visible rays of light. This light belongs to a great family of waves. In this family there are also light waves we can not see—infrared waves and ultravolet waves—as well as X rays, gamma rays and radio waves.

This is a good place to tell what the difference is between a ray of light and a wave of light Suppose you dropped a stone into a still pool of water, and watched the dis turbance it created if the center of all that disturbance were to be considered a light bulb, then the ripples, or waves, of water that go out in all directions from that center might be thought of as waves of light II, however, you were to draw a straight line from the very center of the disturbance to a point on the shore of the policy, this line would indicate the direction of the wave motion with reference to that point on shore This line would be called a roun to shore with is loosely used to designate any arrow beam of light.

Two other terms you will often see in any discussion of light are wave length and frequency These may be explained as follows Suppose you could run from one pole to an other ten yards away in one second, then to another ten yard pole in one more second and so on past ten poles till you have run one hundred yards in ten seconds. The rate of your running would be ten yards, or one pole length, in one second In science, your rate might be known as your frequency, and it would be one pole length per second Saymg the same thing in a different way, the en tire course of one hundred yards is divided into ten lengths of ten yards each. There are then ten complete lengths, or cycles, in all, each cycle being ten yards Science calls this distance the wave length, or the distance be tween two corresponding points on adjacent cycles It is then easy to see that, if the dis tance between poles, or wave length, is in creased the rate of your running one pole length, or your frequency, would decrease



De electromagnetic spectrum abora is charted in approximate wave length values. It incides visible light-rail and standard breadcast waves. The latter vary in range from 7,000 to 21 500 inches, or 500 to 1,500 inlocytes.

As physicists say, the wave-length is in ver-ely proportional to the frequency

But let us get back to the light rays how are they created? When one of the outer electrons of an atom is disturbed in its remi lar rotation about the nucleus-for instance by a collision with a 'free' electron-then a small bundle of pure energy is hurled away from the atom as the displaced electron tumps back into its own orbit. This bundle of energy is sometimes called a quantum. sometimes a photon It flies away at tremendous speed-186 000 miles per second If some special power were given you so that you could look into an atom and see the dis turbed electron being knocked out of its place, and then darting back into place again you would see a tiny flash of light Such a small flash would not amount to much But suppose you could see the same thing happen in many peighboring atoms at about the same time-then you would really see light being created-many photons shooting out together and forming a spread ing light wate. The more violent the atomic disturbances that create the photons the greater is the energy each represents And the shorter the wave length the higher is the frequency of the resulting light rays.

Light waves with a wave-length of thirty millionths of an irch arouse in our eyes the sensation of red color whereas ravs with half that wave length seem violet. Between these he all the other colors of the rambow-the tisual spectrum of light. The subject of light is discussed more fully in your Book or KNOWLEDGY The chapter called Light and What Makes It would be a helpful one for

you to read

#### LIGHT WAVES TOO LONG AND LIGHT WAVES TOO SHORT FOR US TO SEE

Our eye fails to potice any rays of longer wave lengths than that of red and none shorter than the violet rays nevertheless such rays exist. The chart of the whole elecfromagnetic spectrum shows you that the infrared rass which our skin can feel as heat rays are waves just like I ght but with wavelengths many times longer, up to one third of an inch

At the other end of the visible I ght band there is the ultraviolet region with wavelengths down to one half a millionth of an inch Taproduce those very short very high frequency waves much greater disturbances of the atoms are required than are necessars to cause infrared or vivile light. The enor mous temperatures on the sun for instance

make possible the creation of such high fre quency, short wave-length radiation in great amounts Ultraviolet radiation from the sun is so great that all life on earth would be destroyed by it if the earth's atmosphere did not protect us Luckily most of the ultra violet rays are absorbed by a layer of ozone gas twenty miles above the earth!

#### PLECTRIC AND PADIO WAVES

Electric and radio waves travel with the same speed as infrared visible and ultra violet rays that is 186 oog miles per second Like the light rays the electric and radio waves are capable of being reflected refracted diffracted and polarized But as their name implies these waves are produced by electric currents surging back and forth in man made electric gadgets. Depending on whether the frequency of these currents is low or high these waves may have wave lengths of many yards (radio waves) or down to a fraction of an inch (television and radar)

#### THE Y DAYS THAT STADE PROM THE INTER SHELLS OF ATOMS

Let us now turn to the electromagnetic waves with even shorter wave-lengths than ultraviolet light-the \ rays and gamma rays. To create \ rays it does not suffice to disturb the outer electrons of atoms we have to shoot very fast electrons from a special electron source into the inner orbit of an atom of some material like conner or tung sten This will knock out one of those inner electrons such a catastrophe near the nu cleus results in emission of a very powerful photon The rays formed by these photons may have wave lengths only 1,00 the length of ultraviolet waves and you remember how short those are But the X rays have tremendous energy. They can pass through many substances that stop I ght rays. They can cause some chemicals to fluoresce and photographic plates to become exposed. Thus we are able to examine indirectly the inside of many objects. The dentist takes an \ ray picture of your teeth, for example The rays go right through the hard enamel and show in the picture the condition of the invide of the terth

#### THE CAMMA RAYS THAT START FROM THE MUCLEUS OF THE ATOM

Fren shorter and more powerful than Yrays ate gamma rays (Trays) To get these we must produce disturbances inside the very nucleus of atoms! In your imagina tion watch an atom breaking up owing either to radioactivity or to bombardment with high speed particles. It is possible that a neutron in the nucleus may solit up into a proton (positive) and an electron (negative) In such a violent separation into two par ticles, a large amount of energy is released as photons—and these form the gamma rays. Their wave length varies according to the nucleus from which they come The energy contained in such case is so great that some gamma rays are able to split nuclei of heavy atoms just as high speed neutrons do That is a remarkable thing-for the photon repre sents pure energy while the neutron is a real particle

Incredible though it may sound gamma rays are also produced when units of negative electricity (electrons) collide with timy units of positive electricity (the positron particles) Pair by pair these two kinds of particles completely annihilate each other, and in their stead remains pure energy in the form of photons of the gamma rays And conversely if a gamma ray he stopped by a heavy metal it may happen that the photons of the ray break up into pairs of electrons and positrons' Thus in watching the be havior of these rays and particles we realize that we can not make a very clear distinction. between particles (matter) and photons (energy)

#### BETA RAYS AND ALPHA PARTICLES

As you know the nucleus of an atom is ordinarily composed of only two kinds of particles, positively charged protons and equally heavy but uncharged neutrons But when atoms disintegrate (break up) various rays can be emitted (sent out) from the nucleus which may consist of particles that must have been produced there during the disintegration. In telling about gamma rays we said that a neutron inside the nucleus might split into an electron and a proton When this happens to many atoms at the same time, the photons are sent out as gamma rays and the electrons too are emitted at high speed from the nucleus Such electrons form beta rays (\$ rays) Radium for in stance emits beta rays which are high speed electrons as well as gamma rays Radium also emits alpha rays (a rays), which are streams of big and powerful particles each a combination of two protons and two neu trons It becomes evident from this that the structure of an alpha particle is iden

tical with that of a belium atom nucleus. These alpha particles fly out of the radium nucleus at great speed. Like beta rays or other charged particles, the path of alpha rays can be best by a powerful magnet, but photons, like those of gamma rays or light car not be turned from their straight course bo magnets in fact, this experiment with the property of the course of the property of the prope

## OTHER RATS EMITTED WHEN ATOMS BREAK UP

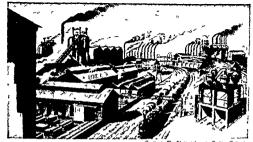
Besides a \( \beta \) and \( \gamma \) trays, the other rays that sometimes are emitted when atoms break up are made up of traveling neutrons protons positions and deuterons. Positions are just like elections except that they are positively charged. A deuteron is a particle composed of one proton and one neutron That is its articuture is like that of the micleus of the heavy' bydrogen isotope deuterium.

#### THE MYSTERIOUS COSMIC RAYS

Lasth let us look at the mysterrous type of radiation called cosmic rays. It has been known for a long time that our earth is been benown for a long time that our earth is been bombarded from the outer world (the cos mos) with rays so powerful that they will go might through many (eat of tend instruments and old miner at the brothern of the cosmic state and old miner at the brothern of the cosmic state and old miner at the product montains. We can not escare these rays.

Let despite many years of work by some of our greatest physicists we do not know with certainty whether these rays are par ticles like Bray's or photons like Tray's Balloons sent up high with instruments have brought back final evidence that the strong magnetic field of the earth bends the rays even at great heights-which seems a par ticle-like behavior for these cosmic rays But just how large the particles are and what their charge, we still can not tell Also, these rays seem to have some photon rays mixed in with the particles If there are such cosmic photon rays they must be of even shorter wave length than gamma rays We know that because they have so much greater energy than the gamma rays

How and where cosmic rays are created is still an unsolved riddle—perhaps waiting for explanation by some inture young scientist who once received his first stimulation for investigating the mysteries of our world by reading the pages of this book.



Courtesy The Flect C . age fis to y Compa

## THE DISTRIBUTION OF WEALTH

By Graeme O'Geran

ECONOMICS is the social science concerned with the production consumption exchange and distribution of wealth. In the article beginning on page 10s you read that four things go into the making of wealth— Island labor, capital and management by the enterpriser. These are called the factors that the produced wealth is shall farm how all labor, those who own land those who own capital and those who bring together land is bor and capital and set there working. This is the produced of distribution.

In some cases a man labors on his own land and uses only his own capital. There are many small farmers who are in this post too. Such a man pers has hiving from tilling too Such a man pers has hiving from tilling his bouldings his tools machines seeds and investock in such a case the worker has the same time the owner of the land a worker or H, an investor of capital and in add item an enterpriser because he supplies all the Than 18 are of the man capital than a context of the supplies and the supplies are the supplies and the supplies and the supplies are the supplies and the supplies are supplied to the supplies and the supplies are supplied to the supplies are su

There are many other occupations in

which a single person may be at once worker landford capitals t and enterprise. For example is calibler or call neutralker may work for himself in a 1 title shop which be ownsusing likewise tools and materials bought and paid for by himself it is such cases there arises no problem of distribution or sharing

of profes. Almost everyone was in this group before the Industrial Revolution of the nine teenth century which resulted in great changes in production methods New heas ier and more expensive machines write in sented for spinning and weasing which only the wealthy could buy and install in espe-cially constructed builtings so longer could the peasant and his wife work with a profit the old fashion spiening wheel and know in their own I tile cottage. It became necessary for them to go to the "factors " There thes had to learn how to operate the machines and they had to work for water No more del they own the work of their hands What they created belonged new to their em player but in giving up their independence as workers they also gamed some advantages. So it became common I it the mass of the people to own perther the ruthinery

(capital) nor the land on which it was housed and they depended upon wages in return for all they had left to self—their labor

Today a factory may be built upon land owned by another and rent is paid to the landlord. The enterpriser then hires labor to work the machines in return for wages

As we already know different names are given to the shares of the produce going to the workers the landlords the capitalist and

the enterprisers

If egg ond Salaries Wages are the most important single source of nits nal income Of the 140,000,000 people in the Linted States around 160 000 000 work for wages or States around 160 000 000 work for wages or production of goods or the ecodering of services. There is no import int difference between wages and salaries. Wage is the term applied to the payment and on a duly or weekly, basis but when payment is based on weekly, basis but when payment is based with the production of the payment as a salaries.

Kinds of Lalor It is common for econ omists to classify labor as either physical or mental. Those relying munity on physical effort are naturally in the first group that of physical labor. This group is itself divided

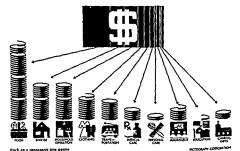
into two groups the skilled and the unskilled. The automobile mechanic and the electrician tre for example, classed as skilled workers while the pick and shovel worker is unskilled.

The mental workers fall into either the routine group or the inventue group. The routine worker such as the bookkeeper or the store clerk having once mastered the routine duties of the job is rarely called upon to use judgment or imagination. Those belonging to the inventue group are relatively free in some factors of the property of the control of the property of

Fineten
Rent Rent is the share going to the land
lord in return for the use of land or some
other fire gift of Nature In a great city
where almost every loot of land, is in use it
see a difficult to distinguish gifts of Nature
from the work of men In ordinary speed
applying to any expenset mode for the use
of land and what is built on it. The true
"ernt however us not this total payment."

Edison Henry Ford H G Wells and Albert

# WHERE A TYPICAL FAMILY DOLLAR GOES



Each to a tablesous out have your grouper

C 336 3

but only that part of the payment which is made for the natural piece of land

At first such a distinction may seem un important, but that is not really so Let us consider the rent of a store on a main street in a large city, and the rent of a similar building in some small village. The village store rents for much less than a similar building in a large city Why? The real reason is location. The city building is sit uated on a busy street and has so many more people passing by it than the one in the village than the shopkeeper can sell many more things in the same period of time in the city than can be sold in the village shop Therefore the city merchant is very willing to pay a higher rent. You can now under stand why in the large city the five and ten cent stores are to be found at the busiest intersections They are in the high rent" area but the high rent is justified by the amount of business done Thus the economic rent is the brice of the natural advantage of one site over another

How Rents Are Affected by Natural and Other Condutions So it is in farming II a farm has poor soil or is poorly situated it yields less in produce or costs more to get produce to market than a farm with rich soil or one that is well located So we see how some landlords may be able to obtain a best next while others can get only a small

one
Let us say that a particular farmer plants
the same amount of corn on two equally well
cultivated pieces of land of indentical size
located five miles apart. However in spite
of identical care the farmer finds at harvest
time that one piece of land yields twice as
much corn as the other Assuming as we
have that all growing conditions were the
same on both polots of ground, the great dif



Draftsmen are 'mental' workers Drawings for blue prints must be in perfect scale and abow precise meas stements.

ference in yield can be due only to the differ ence in the quality of the two pieces of land Rent charged for the surplus grown on the better grade of land is given the name of economic rent

Some land may be especially valuable because there are minerals under the surface II coal or oil is discovered at a certain spot manes, wells and factories will opring up on acres that were formerly worthless. Houses and shops will be built near by to serie the people who will flock to the area. Thus because of the natural resources the land round about will become valuable and will command a higher rent.

Again if a railway is built through an area rents will be taised This is because people have been brought to the area and they have created a demand for houses. In the early days of railroad building some landlords strongly objected to them and tried to prevent the railroads from passing near their properties. When such men size ceeded in their effort, they robbed them selves of rent without knowing it.

Capital and Interest People who save money (capital) may either use it to pur



FSA photo by a chon This greety stere is in the propriete's home which he swar; and since he does all the work him self, on his awa capital.





chase things which directly Latisfy their own wants or loan it to others who wish to make use of it Most money so loaned is used by business organizations for produc tion purposes Money so loaned is called capital This money goes directly into tools buildings and machinery which are the real capital of course Now when a person saves money and loans it out he can not use it himself and so a return for the loan is nec essary to pay for the sacrifice That is why money loaned must be paid for This return for the loan of capital is called interest and is a reward for waiting

There is some risk in an investment of this kind When for instance your father loans money to the government-that is buys a bond-he knows there is no risk He will receive not only interest but also

the return of his money when the bond

comes die Money lent in good security to an old established business firm runs some risk though a small one. So it is with mones lent on the security of a mortgage as it is called of good buildings where the lenders security is based on the fact that if he is not paid he may seize the buildings. In such instances the capitalist (the one loaning the money) has a claim on tangible property which the courts will turn over to him if the loan is not repaid according to its terms

If Everyone Who Saved Money Wanted to Keep It Quite Safe, There Il ould Be Very Little Enterprise It is just because some people are willing to take fisks on the chance of being paid for their risks that capital comes to be invested in business enterprise However, enormous sums are often lost by those who take such risks

Profits You have learned that before the

Industrial Revolution the factors of production were not separately owned Then it was usual for one man to own the land providing his own labor and capital in order to produce whether he were a farmer cobbler or weaver or any other kind of worker

However, with the coming of machinery all this changed One person would have la bor to sell another would have land to rent and still another would have capital to in

To whom did the people go who had these factors to sell? They went to a fourth and new factor which had come into beingthe enterpriser or business man His task it was to bring together the other factors of production in proper proportions, in order that production might be efficiently carried on It is the enterpriser then who assumes the risks for the success or failure of the en terprise He must make the decisions as to the amounts of land, labor and capital necessars in a given plant or business unit

Who is the enterpriser today? Technically he is either the single proprietor who provides all the land, capital and labor him self or the member of a partnership or the stockholder in a corporation, or the business executive who directs the destiny of a great organization such as United States Steel or General Motors The degree of risks involved varies greatly among these individuals. In every case some risk is present and therefore each of these men is an enterpriser. The term enterpriser, however, is popularly applied to executives of large corporations

In return for assuming these important responsibilities and the risks involved the enterpriser is rewarded with profit Prof it is what is left after the costs of doing business are deducted In the case of the single enterpriser, the man must pay to him self what it would have cost him to rent land, here labor, supply capital and pay a manager These are production costs Anything left over is profit. In the partnership what is left after paying expenses is divided up among the partners as profit In the corporation it is paid out in the form of dividends on stock

To the economist and business man there are two kinds of profits (t) Accessary frosts are those required to give a man sufficient incentive to work as director of a business or industry. This incentive must

at least equal what the man could earn by hiring out as an employee to some other en terpriser Strictly speaking necessary prof its are the uages of management (2) fure profits are those remaining after the enter priser pays his labor rent on the land return on capital invested in the business and necessary profits-all costs of produc-tion. To win these pure profits of course is the aim of all business men However for business as a whole they are none to plenti ful Neither are they guaranteed They may be plentiful in good times but may disap pear in periods of depressions. In such times even necessary profit may not exist

How the Distribution of Wealth is Deter mined The proper distribution of wealth between labor's share (wages and salaries) the landlord's share (rent) the capitalist's share (interest) and the enterpriser's share (profit) is a very difficult matter to decide In the main the distribution of this wealth is determined by the action of the laws of

supply and demand

How Rent Is Determined Demand and supply affect rent as they affect prices of anything else, such as shoes or baseballs If many people must live in one place they all demand houses and therefore there is a big call for land at that place This demand raises the price of the land or the rent paid for the use of it

Is it possible in such a case to increase the supply of land to the people who want houses? Yes it is possible If a building of many stories is put up more people can live on the land than if a building of only one or two stories is erected A railway or a bus line can make it possible for people to



Bo h pho os by Harry Ru enste n from ILCWU a Just ce Confe ence between we kers represented by

Confe ence between we kers represented by union efficia s and em ployers (enterprisers) on wages



In the clothing industr a Price Settlement B reau run by both ti union and managemen examines garments d c de rates of pay



live far away and quickly ride back and forth to work. In this way the homes of the people are scattered and in effect a larger supply of land becomes available for them in which case the rent at the busy spot may fall.

How the Return to the Cap talist and the Enterpriser Are Determined As in the case of the return to land and to labor supply and demand largely determine the share of national income going to the capit list and to the enterpriser If for example as the result of an invention a new and success ful business is created more cap tal and managerial ability are required To secure this necessary capital through the sale of bonds high interest rates will be paid and the hope of greater profit will lure the enter priser to associate himself with the new proect This was exactly what happened in the early days of both the automobile and mov ing picture industries. But as more and more capital entered the field and larger numbers of enterprisers sought the rich rewards the

supply of both these factors began overtaking the demard. As a result today the interest and dividends paid by these industries are about on a par with those paid by other major bus ness enterprises.

Hon Wages tre Determined We saw in studying prices in general how the demand for goods really means the demand for goods at a certain price The demand for workers in practice means demand for workers at a certain wage

The employer can not pay more than a certain wage at any particular time unless he can get greater production from the same number of workers If still more money in wages is demanded he can not pay it and

he has to go out of business

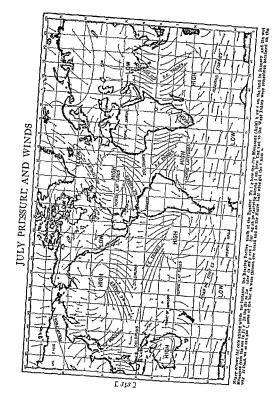
The supply of labor in a trade also governs the price of labor. If for example a large number of workers see, jobs in an automobile player number of workers see, jobs in an automobile player may be able to reduce wages upon player may be able to reduce wages upon player may be able to reduce wages upon player and a table to reduce wages upon players and a table over the worker which can be med field only by good feeling and justice or by the workers wunt ng

The labor unson is a security of nortees banded together to secure for themselves the highest wage which the profits of their trade allow. The union if it does its duty will see that its members are not underpaid and yet it will not be so foolish as to demand a wage higher than the industry can pay. However, the state the employer as often a liquidge of the state of the second profits of the s



E 341 ]

[312]



as you see, in bands north and south of the warm waters coasts of South America. The double arrows

[ 344 ]

# WINDS and OCEAN CURRENTS

By

Frederick Fuglister

Woods Hole Occanographic

Institution

M ETEOROLOGY is the science of wind and weather For centuries mm has wondered where the wind comes from and where it goes. Certain things about the wind were easily observed for instance it was known that in some localities it would blow from the southwest most of the time during the summer and that

when winter came it would just as surely blow from the northwest. But even in such places it was uncertain the wind in midsummer might on any day come from any direction or there m

day come from any direction or there might be no wind at all.

Wen looked at the sky at the clouds and at the sun and moon for signs of what weather to expect If many times they saw a certain cloud formation before the coming of a strong northwest wind then naturally wind. To people in all walks of life a knowledge of what the winds are going to do have been of very great importance Will the wind that blows tomorrow be cold or warm? Will it bring rain or snow or skeet? Will it bow so hard that it damages crops and budges? Bidner answering my of the weather, man had to answer one question. What causes the winds to blot western, man had to answer one question.

Before talking about the causes of the winds let us make sure that we understand all the words used in the explanation We can cover only a tiny part of the study of winds with this part of the science of meter rology, but even so we must be scientists enough to use our words accurately. To begin with



The tornado "twister" over the ocean is called a water spout

what is wind? It is simply air in motion and air is a mixture of gases and water vapor with very very small drops of water and dust floating about in it

Though the air actually moves in all di rections upward and downward as well as horizontally it is only the horizontal motion which we commonly call wind It is still wind strictly speaking when it goes up or down but these motions are called up-drafts and down-drafts The direction horizontally is always expressed as the direction from which the wind blows Usually the compass points are used For instance a northwest wind is air coming from the northwest toward the southeast a south wind is one coming from the south and blowing toward the north When we wish to show a wind s direction on a chart we draw an arrow which points in the direction in which the win i is going

The motion of the a r is measured in many different ways such as feet per second or miles per hour as we measure the speed of a Car, or in knots as we measure the speed of ships or with the Beaufort scale which is numbered o (representing calm) up to 12 (representing a hurricine). It is difficult to measure the exact speed of the wind since the air usually does not move steadily and the speed varies a great deal depending on how high off the ground it is measured.

The grimary cause of the wind is the heet which the critic receives from the sun This heat strangely enough des not warm the art very much so it proves through on the way to the ground. The air receives most of from the cursts surface. Some parts of the earth's surface some parts of the earth's surface status then the more readily than others. The land cadates two rose hew to the air than does the water. Also we the earth resolves about it as sen if moves in certain resolves about it as sen if moves in clean the control of th

When the pressure is high the air sinks an i spreads out across the surface of the earth. It is this list movement of air across the earth's surface that we know as the winds

Most are is lighter than dry air, so we call an area, that contains warm most air a low pressure area and one that contains vid dry air a logh pressure area. To measure this pressure of the air, the meteorologist uses an instrument called the birometer. We generally refer to these pressure areas as simply. High of Log.

If you like at the Wind and Pressure Charts of the world pages 342 and 343 you will see that the wind-direction arrows point out of the high pressure areas and into the low pressure areas.

But you will say why do the arrows curve? None of them goes straight from a High to a Low. You are right The reason for this is the movement of the earth about

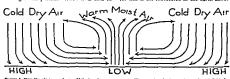


Figure 1. How the air moves from a high to a low pressure area. Warm moist sir rises and spreads out. Cold air (which is heavier) a nka and spreads out below. The diagram is very much exaggerated.

the Northern Hemisphere it is warm in the Southern When it is day on one side of the world it is night on the other

So since the area heated is constantly, changing winter and summer day by day the difference in temperature between one place and another is also changing. As we shall explain the changes in temperature cause the wind to shift its direction and its speed. However in spite of their seemingly errafule behavior the winds on the average do follow set patterns.

When air is heated it evpands. This mems that the same amount of air takes up much more room when it is warm than when it is cold. Therefore ain given amount (a square foot for example) of warm air weight less that is everts less pressure on its sur roundings, than the same amount of cold air. This low pressure air tiese to the upper atmosphere and there spreads out. This in creases the pressure in the surrounding areas.

its axis. As the air moves from a high presure area to a low pressure area it is forced to the right in the Northern Hemsphere to the right in the Northern Hemsphere Thirs curving of the wind as I goes into a low pressure area is known as a cyclone or a cyclone. Wind The wind is a strong one if the drop in pressure is great. The movement cyclone. You can see that in the Northern Hemsphere a cyclone wind moves in a counter clockwise direction and clockwise in the Southern Hemsphere (Clockwise meant clockwise of course means the other way

round )

The word cyclone has two meanings It is
the name given to certain tropical storms
but for the meteorologist it describes the
movement of air into a low pressure area
and it may be a violent storm or it may not
Sometimes a low pressure area is quite large



Figure 2. Wind in the Northern Hemisphere 1) Arrows point out of high pressure into low pressure areas 2) The earth a rotation causes winds to curve (a cyclone) 3) Counter-clockwise cyclonic motion in Northern Hemisphe e

more than a thousand miles across in which case the winds may not be very strong

If the earth's surface were all one materral (if it were covered with water for in stance) then the wind systems would be comparatively simple Around the world at the Equator there would be a belt of low pressure since that area receives so much direct heat from the sun Both north and south of this belt there would be belts of high pressure because the warm rising air of the Equator would spill over increasing the pressure on either side Next in the subarctic and subantarctic there would be belts of low pressure with strong winds And last there would be high pressure areas due to the cold at the two Foles. The winds would then blow in the di

rections shown in Figure 3 The belts of low and high pressure would move north and south with the seasons north during the Northern Hemi sphere's summer and south during the winter

As a matter of fact since by far the great er part of the earth s surface is covered by water the wind six

tems are something like those on our imaginary water-covered globe. The northeast and southeast trades do blow consistently toward the Equator we do have a region of prevailing westerly winds. But the only one of these wind belts that extends completely without interruption around the world is the belt of the westerless in the Southern Hemisphere of the westerless in the Southern Hemisphere early is entirely covered with mater, except for the tim of South America.

During the summer months air masses that lie over the land are much warmer than those over the water (We have already said that the land radiates heat from its surface much more readily than the water The sea absorbs much of the heat and gives it back slowly ) In winter therefore the air over the sea is warmer than that over the land This is especially true where the land area is large So we have a relatively low pressure area over the land in summer and a High in winter Consequently the winds blow onto the continent in summer and away from it in winter These winds are known as the monsoons The best known monsoon is the one that blows across the Indian Ocean onto the continent of Asia As with the word cv clone monsoon is often thought of as mean ing a violent storm but that is not the case

The northeast mon soon that blows in winter across south ern Asia out over the Indian Ocean does not bring any tain and the winds are quite moderate

This seasonal changing of tempera ture and pressure over the continents of course plays havoc with our simple tha gram of high and low

HIGH WESTERLIES IN THE TRADES IN THE TRADES

Figure 3. The regular pressure belts we would have if the earth were entirely covered by water

pressure belts We now see that there can not be any continuous belts of high and low pressure around the world where the belts pass over both the continents and the oceans. Because of this the pressure areas and their resultant winds break up into the patterns as you see them on the Wind and I ressure charts. You will notice that over the oceans the winds blw in much the same directions in winter and sum mer. It is only near the land that the large changes tale, place with the seasons.

There are two important things to remember when we study average wind charts First because of the small size of the charts many winds that are very important locally are not shown. Every mountain every fiver has its own effect on the prevailing winds A chart may show southwest winds as the summer condition in a certain large area yet because of the lay of the land there may be a valley in that area where the summer winds are southeasterly The second thing to remember is that these charts show aver age conditions That is the winds usually blow in these directions but not always es pecially not on the land areas. The trade winds which are over the oceans can be expected to blow as indicated on the chart though they may be a little stronger one day than the next. The westerlies in the south ern Atlantic are almost as certain and can be relied on to blow at gale force a good deal of the time during the winter

Let us now consider the storms or dis turbances as the meteorolog st refers to them A storm is a small traveling low pressure area. When it starts it moves very slowly gradually increasing its speed and size until it may be as large as eight hundred miles in diameter. When a disturbance has reached such proportions, the winds are not nearly so strong as when the storm area was smaller The strongest winds are associated with the smallest and briefest disturbances For example there is the tornado of the United States which may last only a hali hour, and measure only one thousand feet across but which does considerable damage even in that short time 'The change in pres sure is very great in these storms and the air rises very rapidly

The polar front as shown on the Wind and Pressure charts indicates where the cold art from one of the Poles meets the warmer tropical air. It is a constantly shifting front and it is along this boundary, line that most depressions travel. The front does not always.

represent a sharp change in temperature but where a storm is most likely to be severe. The polar front line on the Wind and Pressure charts shows how the cold air most down over the continents during the northern winter and records in the summer.

On the Ward and Pressure charts you will find the names given to the major wind sys tems such as the trades and westeries You also will find the names given to those areas where there is rarely any wind at all the doldrums and where the winds are light and variable the borse latitudes. Not shown or named are the northers that blow across the Gulf of Vienco in the winter the tornadoes that usually occur in the upper Mississippi and Missouri valleys of the United States and the Santa Ana in California a bot wind that blows from the desert toward the Pacific Ocean There are hundreds of other winds all over the world many of them having very strange names such as the elephanta of India the williwaws in the Straits of Magellan and the southerly buster in Australia

The names that are most familiar to us are those given to the storms. The hurricane is a tropical storm that occurs in the western parts of the occass near the Equator that parts of the occass near the Equator that the western that the storm of the West Indies a hurricane the ones in the In dian Occan are called cyclones those in the China Sea are called typhonos and the Aust Iralians who like unusual names call the coast the will'w silles.

Almost 150 years ago a British admiral, Sur Francis Bernfort devised a method of quessing the wind a selocity. This instrument is still used on ships though it is not very exact. The Heaufort scale as it is called registers winds as shown below.

#### THE BEAUFORT SCALE

| Scale<br>Sumber            | Speed of 11 md<br>en Statute Miles  | Description of 13 and  | indications on Land  |
|----------------------------|---|--|--|
| 7<br>5<br>6<br>7<br>8<br>9 | Less than 1 1 to 3 4 to 7 8 to 7 8 to 12 13 to 18 19 to 24 23 to 34 32 to 34 39 to 46 47 to 54 44 to 75 Over 75 | Calm Light Ar Sught Breeze Gentle Breeze Moderate Breeze Fresh Breeze Crong Breeze H gb Wind Gale Strong Cale Whole Gale Storm Hurmane L 748 ] | Smole goes attaight up Smole drift! Leaver rustle. Leaver rustle. Leaver rustle. Leaver rustle. Desir Ce, and paper small breaches move Small trees saay wavelets on water Larce branches move umbrille are blown Whole trees move wealth on it difficult The state of the state of the state of the state Leow shingles and chimerys po Trees may be upcosted Lamane in skinsprad Anyth ng may go |

w/m

No one knows who the first ocean travel ers were But whoever they may have been no doubt one of the first things they noticed apart from the huge quantities of water was that the water beneath them would often carry their boats from place to place even when there was no wind to blow them about Certainly the tides the rising and falling of the water along the coasts must have been known to man thousands of years ago. And he soon found if he lived on a small bay or inlet, that when the tide was coming in he had a difficult time putting out to sea in his tiny boat. So it was that he first learned of ocean currents. But it was many more cen turies before he realized that there are other and much larger currents in the oceans than those caused by the ruing and falling tides

Tidal currents especially where they flow between land hanks more much more rapully than do any other of the ocean currents. But tidal currents are nowhere near so large and do not travel so far as ocean currents. The speed of ocean currents can not be compared to air speeds. The fastest tidal currents rarely more more than of moles an hour. This compared to known wind speeds of 150 miles an hour, is very slow moded. Yet for ships at sea even a current with a speed of one knot means something. The most interesting things about ocean currents however are the direction in which they travel and

the amount of water that they transport. The direction in which a current is moving as called the set of the current. A north-casterly, current is one setting or moving toward the northeast. The speed of the moving water is expressed in knots, and is called the drift of the current. A knot is equal to one nautical mile per how (about 2020) one nautical mile per how (about 2020).

vards) There are three main causes of the ocean currents giving rise to three different types of water movement. The first is the attraction of the sun and moon which causes the tidal currents. The second is the prevailing winds such as the trafes and westernes which through friction set the water in motion. The third cause is the heat from the sun which affects the density of the water The differences in density from one place to another cause the water to move much as the differences in air pressure cause the winds Warm water is lighter, less dense than cold water. The density of sea water is affected not only by the temperature but also by the amount of disvived salts it con tains The more saline (salty) the water, the heaver or more dense it becomes If you will look at the chart of the ocean currents you will see the names of all the major currents the arrows showing the di rections in which they flow. You will notice that most of the names given to the currents are simply the names of the containes by which they pass as the Brazil Current the Cabiforna Current One of the potable exceptions to this custom is the Guilf Stream. The name given this current brings up an interesting point.

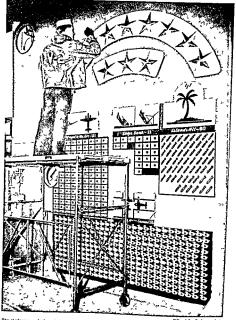
It was named the Gulf Stream because it was supposed to come from the Gulf of Mer 100, but observation has shown that it has three major sources—first the e waters from the Caribbean Sea which follow the shores of the Gulf Second those Caribbean waters which flow directly by the north coast of Cuba and third the Antilles Current which forms part of the Gulf Stream north of the Bahania Jahan.

We can not point to the beginning of any of the major occan currents. The names we give them are simply for convenience in locating and pointing out the changing characteristics of the current patterns in the occans. So the system of naming currents according to where they are or by the names of the countries which they pass is a simple

and convenient one All the major ocean currents carry vast amounts of water over long distances. Since water temperatures change slowly currents act as cooling or warming agents upon the Lind masses near which they flow depend ing on whether the currents come from cold or warm regions We call a current warm if its surface waters are warmer than the water through which it flows Actually if it is a deep stream a warm current may be carrying along extremely cold water well beneath the surface Freent for the tidal currents along the coasts very rarely dies an ocean current reach to the bottom If the current is caused entirely by the wind it will be con paratively shall w The deepest currents are those caused by changes in

The anshore total currents receive their couries every are hours or every twelve bours, depending on the tital period. The offshore total currents constants change their direction of flow and are often called noty, current, The currents called mos won drifts, raised by the mossion winds change their course with the season. The root important are the northerst and south west monseon drifts of the Indian Ocean drifts of the Indian Ocean.

density of the water



The gierfour record of a guilant ship on board the light carrier Monterey Prank C Schroyer Patter Ind Core of Philadelphia is purtuag the list, proud touch on the ship a scoreboard of hattie action. The Manterey was of the first major tests of the Pacific Sect to service in Res' York For



1945 Calendar

activities of armies and people of nations and individuals are all listed in the follow ing calendar of the year's headline highlights

Ian I France joins the United Nations Jan 3 United States First Army attacks northern flank of German salient in Bel gium -General Nicholas I lastiras organ izes new Greek cabinet

Jan 4 New American landings on Mindor) Island in Philippines are unopposed Jan 5 The Soviet recognizes provisional government of Poland set up under Rus

sian sponsorship at Lublin Ian 6 Turkey breaks off relations with

Japan Jan o Americans invade Luzon Island in

Philippines land at Lingaven Gulf Jan 11 British representatives and leaders of Greek National Liberation I cont sign truce ending civil war -- Germans forced

back twenty three miles in Belgium Ian 13 Russians begin great offensive in

Poland Jan 14 Vazis withdraw to the Westwall Jan 17 Warsaw, Polish capital falls to Soviet troops

Ian 20 Hungary signs armistice with the

Ian 21 Russians take Tannenberg gain in Jan 22 Ledo Road from Myitkyina Burma

to Ledo India is officially opened Jan 23 United States troops capture St 1 ith Belgium

Jan 25 Russians seize Gleiwitz Germany 136 miles from Berlin Jan 28 Americans retake Clark Field on

Luzon Ian 20 United States forces enter Germany near Oberhausen and Leterskirche - \ew landing made on western Luzon

Jan 31 Czechs recognize Polish Warsaw government

AWORLD at war became a world at peace before 1945 was torn from the calendar Mechanized Allied land armies in the east and the west crushed Germany between them with the aid of the most powerful air forces in history. Hitler's legions tottered even as representatives of the United Nations met in San Francisco to discuss an organization for permanent world peace

The unconditional surrender of nazi Ger many was announced on May 8

Japan alone fought on China made stronger by United States aid fought back on the mainland American and British navies blockaded the Japanese main islands

In early August science threw its greatest weight into the war as an atomic bomb smashed the Japanese city of Hiroshima Nagasaki was destroyed as the second atom charge was loosed on Nippon Russia de clared war and attacked in Manchuria

The Imperial Japanese Government un conditionally surrendered to the Allies on

August 14 I eace became a reality and with it came

many obligations Strengthening the United Nations Organization feed ng and governing conquered lands and changing industry back to percetime production were and are some of the world's problems

Fore gn affairs and national events, the

Feb 5 Lound or declares war on Japan Feb 6 Ceneral Douglas MacArthur an

nounces fall of Man la Feb 7 laraguas declares war on txis na Lions

Peb 8 Canadians and British start oush in Holland

Feb to Americans take main Roet River dim

Feb 12 Official ann incement declares that the Re Three Research Churchill and Stalin have met at Valta in the Crimer Agreement has been reached in program to crush Cermans and Coward well en cenn ent

Feb 13 Rus inn i rees cas ture Bu lanest Feb 15 This bembed by 1 cool mited

States carr er clanes Feb 16 Americans land on Corregilor in

Man la Bay

Feb. 10. United States and hibi his to some land on two Jima 750 miles from Tokyo Feb 21 Inter American Conference on

I roblems of War and Leace opens in Mexico City

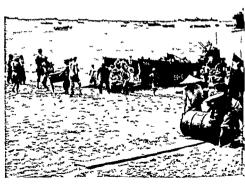
Feb 23 Turkey declares war on Germany an I Japan - Americans take Mt Suri bachi en Iwo Jima.

Feb 24 Fevr t declares war on Axis Feyttinn prenier is assassinated - Argentiny only American nation not in United \2

ticas Organizato n as Cruguas joins Feb 28 Americans cross Frit River and aptreach Cologne -Saudi Arabia and Iran declare war on Axis - F gypt an I Turkey

in I n ted Nations Mar a funish formally declares war on Lurmanı

Mar a Kussians reach Baltic coast near Kolberg Germany



2712

Landing supplies on the west coast of Luren Philippine Islands, following brilliant action in January F 9797

Mar 6 United States troops capture Cologne Mar 7 Chinese clear enemy from Lashio, Burma

Mar 8 American forces cross Rhine via Hindenburg Bridge at Remagen fast ac tion prevents Nazus from destroying structure—Inter American Conference on Problems of War and Peace closes at Mexico City Act of Chapultepec and

Dumbarton Oaks Conference indorsed
Mar 10 Japanese seize control of Indo
China

Mar 12 Russians take Kustrin Oder River stronghold

Mar 14 Royal Air Force announces bombing of Germany with new eleven ton bombs

Mar 16 It is revealed that giant German

V 2 rocket bombs have been hitting Lon

don and southern England causing heavy

damage Mar 17 Japanese resistance ends on Iwo

Jima

18 Americans invade Panay Island in
Philippines without loss—Affied bombers
blast Berlin in war's heaviest raid by day

Mar 20 British take Mandalav Burma
Mar 22 Delegates of six Arab states sign
final draft of constitution for new Arab

League
Mar 26 Americans enter Frankfurt and
Limburg —Cebu Island in the Ph lippines

is invaded

Mar 27 Argentina declares war on Ger
many and Japan

many and Japan

Mar 29 Negros Island invaded by United

States forces

Mar 30 Russians take Danzig Apr 1 United States Tenth Army lands on

Ökmawa Jaland in Ryukyu group Apr 3 Siegen falls to American First Army Apr 5 The Soviet denounces non aggression pact with Japan—General of the Army Douglas Mac Virbur and Fleet Admiral Chester W. Nimitz to lead Army and Navy Jorces aggrants Hapan

Apr 7 Japanese lose six warships in sea bat the fifty miles south of their home islands Apr 9 All es begin offensive in Italy— United States recognizes Argentina Gov

ernment
Apr 11 Chile declares war on Avis —Spain
breaks with Japan

Apr 12 President Franklin Delano Roose velt dies succeeded by Vice President Harry S Truman

Apr 13 Vienna falls to the Russian army Apr 16 Seventh American Army enters nazi shrine city of Vuremberg Hitler or ders last stand

Apr 18 Germany split in two 18 American Phird Army enters Czechoslovakia Apr 19 United States troops take Leipzig

and Halle

Apr 21 Soviet signs twenty year peace pact
with Warsaw I olish government

Apr 22 Russians reach heart of Berlin Apr 25 United Nations Conference on In ternational Organization opens at Sin

Francisco forty six countries represented
Apr 26 Bremen falls to British Stettin to
Russians

Apr 27 Allies take Genoa in Italy Apr 28 Benito Mussolini former dictator of Italy is executed it I artisans in village of Dongo on Lake Como Apr 20 British Fighth Arms captures Mi

OSC of U. S. Navy biographic Conference of the C

Ian and Lenice in northern Italy Apr 30 Munich falls to the Americans

May r German radio at Hamburg broad casts report of Adolf Hitler's death May 2 Sazis surrender Italy and part of

Austria 1,000 000 men lay down arms May & Hamburg gives up to the All es with out a struggle-British take Rangoon

May 4 Germans in Netherlands Denmark Helgoland porthwestern Cermany and Frisian Islands surrender to British May 6 Germany signs in I tary surrender at

Re ms France May 8 1 E Day Germany officially surren ders unconditionally at 6 of PM Fastern

War Time May o Reich Marshal Hermann Goering Field Marshal General Albert Kesselring

and puppet Frem er Vidkun Ouisling of Norway arrested as war crim nals May 10 Australian forces capture Wewak I eninsula in New Gu nea

May 15 Au tria abolishes all nazi laws and establishes prov s onal government -For mer nazi I ropaganda Minister I aul Joseph Goebbels reported a su cide May 17 Sagoya Japan hit with fire bombs by soo R 20 Superfortresses for second t me in four days

May 21 Chinese take Hoch h in new Kwangsi Province drive

May 23 German General Staff dissolved Grand Admiral Karl Doenitz and aides seized - Heinrich Himmler former Ges tapo chief commits suicide after capture May 24 More than 500 B 20 s from the

Marianas Islands bomb Tokyo May 20 Yokohama pounded by 450 Super

fortresses June 4 All es announce terms of B g Four agreements setting up Allied Control Council to exercise supreme authority over

post war Germany June 6 Brazil declares war on Japan

Tune 7 King Haakon VII of Norway returns to Oslo after five years of exile June 11 Australians invade Borneo at four

po nts in Brunei Bay area June 15 Joach m von Ribbentrop former nazi Foreign Minister is captured in

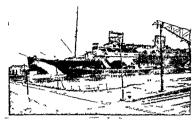
Swedish hideout June 10 Lieutenant General Simon Bolivar Ruckner commander of all land forces on

Okmawa is killed in battle June 21 Organized Japanese resistance on



A ship the Cermans did not dare to send to sea during the bostilities the luxury liner Europa dothed at Bremerhaven

Official II S Navy choto





Canad an A my photo Canadian engineers at work floating sections of a Balley Bridge into place on the Rhine

Okinawa comes to an end

June 26 United Nations Conference ends at San Francisco after sixty three days with delegates from fifty countries sign

ing new world charter
June 27 General Mac Arthur proclaims full
liberation of Luzon Island in I hilippines
—Secretary of State Edward R Stettings

June 30 James F Byrnes is named Secre tary of State by President Truman July 5 Conquest of the Philippines is com

pleted
July 6 Nicaragua becomes first nation to
ratify United Nations Charter

ratity United Nations Charter
July 7 Polish Soviet trade pact signed in
Moscow
July 10 Record land and carrier plane raids

rip Japan July 17 Churchill Stalin and Truman be gn Big Three Conference at Potsdam Germany July 23 Marshal Henri Philippe I étain goes on trial for treason in Paris.

July 24 United States carrier planes attack Japan's greatest naval base at Kure Hon shu Island July 26 Winston Cherchill replaced as

Prime Minister of Britain by Clement Att lee—President Truman announces joint United States Britain China unconditional surrender ultimatum to Japan This Potsdam Ultimatum outlines Allied pohcy

for Japan July 28 United States Senate ratifies United Nations Charter

July 31 American destroyer force shells Shimizu Japan's most important alumi num production center

Aug 2 Big Three parley adjourns at Pots dam fifteen page report on agreements reached is released

Aug 4 President Truman s gns Bretton Woods legislation United States first to

approve world bank and world fund Aug 5 Atomic bomb smashes Hiroshima.

Japan Aug' 8 Second atom charge loosed on Japa nese city of Nagasaki -Russ a declares war on Japan effective August 9 - Presi dent Truman signs United Nations Char

Aug o Russian offensive begins in Man churia

Aug 10 Japan makes b d for peace agrees to accept I otsdam Ultimatum if Emperor Hirohito is permitted to retain his throne Aug 11 Allies agree to let Emperor retain

throne if he will submit to authority of Supreme Allied Commander in Japan Aug 14 Japan surrenders unconditionally fighting stops

Aug 15 Petam condemned to die for trea son sentence changed to life imprison ment by General Charles de Caulle

Aug 19 MacArthur aides meet Tokyo sur render mission in Man la

Aug 26 Russo Chinese pact signed on Aug 14 calls for mutual aid through Chung king Government Chinese Communists to get no aid

Aug 27 First American airborne troops land in Japan at Atsugi airdrome sixteen miles southwest of Tokyo

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Aug 29 Four power War Crimes Commis sion releases names of twenty four nazi war criminals to be tried at Nuremberg Aug 31 United States and Finland resume

d plomatic relations Sept 2 V J Day proclaimed as Japan signs official surrender terms aboard battleship

Missouri in Tokyo Bay (Surrender took place on September 1 United States time ) Sept 4 American flag waves again over Wake Island as Japanese lay down arms

Sept 8 Tokyo officially occupied by United States troops - r 000 000 Japanese give up in China, Formosa, Indo China and the I escadores

Sept 13 Imperial Japanese General Staff dissolved

Sept 19 Prime Minister Attlee of Great Britain pledges self rule for India Sept 25 Natives of Annam revolt against return to French rule

Sept 29 Foreign ministers in London an nounce mutually satisfactory plan for es tablishing policy necessary to carry out Japanese surrender terms, United States to lead Far Eastern Advisory Commission Oct 2 Annamese revolt against French in

Indo Chma ends

The Post Office at Riel, Germany after a Royal Air Force raid. Many raids were needed to put this Beitte port out of operation.



At night the skies over Okinawa glowed with the flash of projectiles from the weapons of the Japanese and the Marines. In the battle for this island the United States suffered the beariest lasses of the Pacific war

Oct 3 Russia refuses to join Far Eastern Advisory Group unless four power control council for Japan is established

Oct 4 Indonesian nationalists in Java seize cities of Surabaya and Bandung in protest against Dutch rule Oct 6 New Japanese cabinet organized

with Baron Kijuro Shidehara as Premier Oct 8 President Truman says the United States will keep the atomic bomb secret

Oct to United States invites representatives of nine governments to Washington on October 23 for Far Eastern Advisory Commission discussion -- British and Rus sian troops to leave Iran -- France and Britain sign pact recognizing French rights in Indo China

Oct 15 Former French Premier Pierre La val is executed in Paris as a traitor after

suicide fails Oct 16 United Nations Food and Agricul

ture Organization holds first session at Quebec Canada Oct 19 Far Eastern Advisory Commission meeting postponed in Washington as Rus

sia fails to accept invitation Oct 20 Outer Mongolia votes to cut all ties with China and become independent

republic Oct 21 French vote approval of General

Charles de Gaulle's plan to draft a new

constitution Oct 23 \idkun Quisling is shot as a traitor in Norway Oct 24 The United Nations Organization

is a reality as the Union of Soviet Social ist Republics becomes the twenty ninth country to ratify the charter Oct 28 Chinese Communists report clashes

between their troops and Chungking Na tionalist armies in eleven provinces

Oct 29 Getulio Vargas resigns as president of Brazil replaced by Supreme Court Jus tice Jose Linhares until coming general elections

Oct 30 First meeting of Far Eastern Advis ory Commission in Washington votes re cess for week Russia still absent

Nov 1 United Nations Food and Agricul ture Conference ends in Quebec with an appeal for constructive world action

Nov 2 United States recognizes the provi sional governments of Hungary and Brazil Nov 5 I resident Truman opens a labor

management conference in Washington with eighteen delegates from each side in attendance—Hungary has first popular election in its history Small Landowners party wins over the Socialists and Com munists

# RESCUE IN THE WAKE OF VICTORY





S gnal Corps photo be most famous prisoner of war-General Jonathan M Valuaright baggard but smiling after being rescued som three long years of Japanese imprisonment.

Nov 6 Indonesia rejects the Netherlands offer of empire status full independence is revealed as chief objective.

Nov 7 Arabs kill seventy four Jews in Libya troops restore order—British jet propelled airplance flies record 606 miles per hour

Nov 8 British warn Indoesians to disarm or face attack—Tripolitania rists rage

anen

Nov 9 United States and sixteen other
countries meet in I aris to discuss German
reparations

Nov 10 Prime Ministers Attice of Great Britain and king of Canada arrive at Washington for atomic bomb control discussion

Nov 11 Planes blast Java naval base of Surabaya as British advance against Indo nesian nationalists

Nov 12 Former United States Secretary of State Cordell Hull awarded Nobel Peace Prize for 1945 International Red Cross for 1945.

Nov 13 President Truman agrees to joint inquiry with British on Palestine issues— Tally of Yugoslavian ballot held on No vember 12 finds sweeping victory for



Offic at Mar ne Corps pho o

Leathernecks wading towards the abore line of the Land of the Rising Sun to assist in the occupation of Japan.



Marshal Tito's regime --General Charles de Gaulle unanimously elected interim president of Provisional French Govern ment

Nov 14 Russia again asks for veto vote in Japanese Control Council

Nov 15 President Truman and Prime Ministers Attlee and king announce in Washington that atomic bomb secret will not be shared until the United Nations

Organization devises a control plan Nov 18 Bulgaria holds first general election since 1940, Fatherland Front party wins -Revolt reported in Azerbaijan province of northwestern Iran

Nov 19 Chinese Nationalists drive forty miles into Manchuria-Iranian troops move to halt rebels in Russian occupied

province of Azerbaijan Nov. 20 Nazi war crimes trial starts at Nuremberg Germany - General of the Army Dwight D Eisenhower appointed Army Chief of Staff Fleet Admiral Ches ter W Nimitz made Chief of Naval Operations -A B 29 Superfortress smashes

seven year record by flying 8,198 miles non stop, Guam to Washington D C Nov 21 The United Automobile Workers of America strike against the General Motors

Corporation.-General Alexander Patch, leader of the United States Seventh Army in Europe dies at San Antonio, Texas Nov 22 Chinese Nationalist troops out

flank south Manchurian port of Hulu Nov 24 General MacArthur imposes severe

tax on all Japanese wealth Nov 25 First Austrian general election in fifteen years indicates defeat for the Com munists in an overwhelming Socialis

victory Nov 26 United States proposes that the Big Three remove all troops from Iran by January 1, instead of March 2, action

urged to calm fears of small nations Nov 27 Major General Patrick J Hurley resigns as United States Ambassador to China, denounces State Department pol icy, replaced temporarily by General of the Army George C Marshall

Nov 29 Surabaya falls to the British after nineteen-day battle—Monarchy ends in Yugoslavia

Nov 30 Labor Management Conference closes in Washington after little success Dec 2 Brazilians cast first presidential vote in fifteen years General Eurico Gaspar Dutra is elected—Albania votes in na tions first free ballot Democratic Front

ter wins by large majority

Dec 3 Russia rejects United States proposal

to leave Iran by January 1
Dec 4 Alcide de Gasperi named Premier of
Italy by Prince Humbert Lieutenant
General of the Realm

Dec 6 Lieutenant General Tomos uki Yam ashita convicted as war crim nal n Man la will de by hanging —United States and



Press Associat on Inc.

Great Britain announce signing of a new I an agreement whereby the United States will lend \$4,400 000,000 to Figland

Dec o General George S Patton Ir seri cusly injured in automobile accident at Mannheim Germany - General MacAr thur orders Japanese Government to submit plan ending feudal farm system

Dec to RAF planes destroy Indonesian village after ambush of British convox

Dec 12 Chinese Central Government troops enter Manchurian capital of Mukden no Communist opposition

Det 13 British and France conclude agree ment on Syria and Lebanon all troops to be withdrawn December 21

Dec 15 United States chosen as permanent home for the United Nations Organization Dec 16 Big Three f reign ministers (pen meetings at Miscow - Chinese Commu

nists in Chungking to discuss peace Dec 17 United States Supreme Court stays execution of General Yamashna

Dec 10 I resident Truman nominates former Secretary of State Edward R Stettinius

as principal United States delegate to the United Nations Organization Other delegates nominated are Secretary of State James I Byrnes, Senator Tom Connally Senator Arthur II Vandenberg and Mrs I leanor Loosevelt

Dec 20 Dr Karl Renner, Socialist, is elected president of Austria

Dec 21 General George S Patton, Jr., dies at Hei lelberg Germany Dec 22 United States and Great Britain

recognize the Yugoslavian Republic Dec 23 Pope Pius VII announces names of thirts two new cardinals, for the first time in history every continent will be repre-

sented in the College of Cardinals Dec 25 French Government announces devaluation of the franc.

Dec 27 Big Three state conclusions reached at Moscow conference of foreign ministers international control of atomic energy agreed upon Russia gets veto vote in Impanese affairs -Twenty-eight nations sign Bretton Woods Monetary Pact at

Washington Russia absent





Three little kittens. No not these Two lons and a tiger please



N w Yo k Zoo g 1 Soc 1



What's th's? What's th's A baby llama

Wh sper ng secrets To ts mama

Th s t ny baby monkey Longs to F nd out whom that face Belongs to

Baby kangaroos don t fuss About a trolley or a bus But de where et mama goes-Rather bumpy I suppose





[ 366 ]





This under we so as a flag partice by Rub Presen Shaw the prents of the at of flage parting The author of his actic was presen when Meas Shaw partice be seene I on he about a quarry as hu [ 368 ]

# FINGER-PAINTING



Two youthful finger painting experts Finger painting ap

NOT so very long ago in a school for American and British children in Rome Italy a little boy cut his finger His teacher an American lady called Niss Ruth Faison Shaw told him to go to the bathroom and put some ondine on the cut. The little boy did as he was told Then he happen the rom his notions staned for the produced was been out to be some of the control of t

Now many generations of children have loved to make pictures and designs with their fingers—in sand and mid on the dist that settles on furniture on frosted window panes it was perfectly natural therefore for the little boy to continue with h is odine decoration of the bathroom door He found his task so pleasant that the time passed very quickly 'Finally his teacher decoded to see what was keep ng him so long When she entered the bathroom she saw the boy's masterpiece on the door

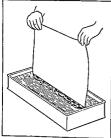
Since Miss Shaw was a wise teacher she did not become angre. She realized that the boy was doing a perfectly natural thing he was simply expressing himself artistically. In fact, the suddenly realized that finger painting offered many execting possibilities. Would it not be an ideal artistic activity for young children who lack shill in handling brush and pencil?

So Miss Shaw decided to perfect a paint that would be suitable for this purpose It would have to be non poisonous, because

children might absent mindedly put their paint stained fingers in their mouths. After much experimenting Miss Shaw finally created a paint which looked like jelly and felt like solt mud. With this material children could paint away to their beart's content with perfect safety to themselves and to their clothing as well

It was in the year pairs In the following perfected her finger pairs In the following year as he brought them to the United States. The art of finger pairs here popular from that time to that It is now a lavorite activity in school in summer camps in playgrounds and in homes Although it was first created or young the liften it has at first created left rehildren and adults including profusional raties In World War II finger in the world was a superior of the provided of the provided rehildren and selling was used to provide entertainment in USO (United Service Organizations) clubs and in hospitals maintained by the armed forces.

In this sertisle we shall tell you how you too may the part in this facentating active your shall be part in the secretary and the youngled with the paints. Shaw firger pants in glass screw too pars may be bought in a special set of ser the set includes par mide spatulas (A epatula is a promited part of the part of t



How the wet paper should be removed from the pan

in all—yellow red blue green brown and black As we have pointed out the paints are

harmless when swallowed though of course they are not meant for swallowing! They are harmless to the skin They can be washed off the hands or arms with water If the paint gets on woolen clothing it may be brushed off when it dries If it gets on cot ton material it will come out if the material is soaked in cold water and then dipped in warm soap suds

In addition to the paints you will need a wooden spatial for each jury Thin paper on which you are to paint comes in sheets of some these by 22 inches 192 is neckes 192 is neckes 192 inches 192 is neckes 192 inches 192 i

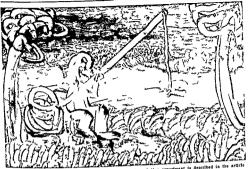
 should lay in a supply of newspaper or sheets of rough cardboard larger than the paper on which you paint (As we shall see the newspaper or cardboard is to be used to drying purposes) Finally you should have paint rags any clean rags will serve the purpose

We are now ready to paint First we make sure that the surface of the table on which we are to work is perfectly clean. Then we are to work is perfectly clean. Then are our arms to the elbows as a far above the elbows as possible. Next we take a sheet of paper and roll it into the torin of a cyl of paper and roll it into the torin of a cyl of the paper. If non one of the short soler of the paper. If non one of the short soler of the paper and the short soler of the paper and the short soler of water or into a sink. Then we take hold of two corners of the paper and draw it out of the water as shown on this page.

of the water as shown on this page.
We put the paper glazed surface up on
the table With one hand we smooth out
wrinkles and are bubbles with the other we
lift the edge or the corners of the paper to
let the aur eszage We now eelect one of the
colors in the paint jars before us With a
spatial we do not a quantit qual to a
table-poonful and put this upon the paper
Wetting our hands we smear the color over.



Courtesy B neey and bm b Compan artist is using all the fisgers of his righ stoce the effect that he wants, Very tall



The Fisherman This painting was done by the little boy whose fedine experiment is described in the article

the sheet of paper and with the flat of the hand we work away at the blob of paint until it has been spread evenly and smoothly over every square inch of the surface of the paper

In panting you are to use your palms, the sade of your hands, your finger tups your finger mails, your knuckles your thumbs seen your forerans. Work with rhythmical missular mon ements of the whole body do not be afraid to let yourself go Never mind about producing a masterpiece at first Just work away with all the natural brushes that we named above and see what effects you can produce Experiment and make discoveries. If the paint becomes dry, a few drops of water should be sprinkled on it. Wet paint gives better contrasts and more pleas age tetures than dry paint.

Here are some useful hints. The back ground and fin away things should be done first they should be started at the top rather than at the bottom of the paper. For a smooth background cover the paper was then vertical or horizontal strokes applied with the flat of the hand the forearm may also be used for this purpose

Use your thumb for stems and flowers pat the paint with the side of the hand for ioliage use the fingernails for fine lines or

grass To make a part of your painting light er, apply pressure as you move your palm over the paper You can stroke out details with your fit gernails At any time you can rub out what you have done by moving the

rub out what you have done by moving the flat of the hand over the paper You may paint with one color or with

nor than one it is advisable however to more than one it is advisable however to more than one with the technique of finger paining. Golors may be blended by putting one on top of the other and then rubbing away until you have the desired hue. You may apply pure color to a given part of the paining they may not use the desired with a paint range, we color may be rubbed smooth on the table top or in the palm of the hand.

You will be amazed at the number of subjects that lend themselves to finger painting. You will be able to patterns You will be able to patterns You will be able to patterns. You will be able to patterns You will be able to provide the subable to provide your subtion of the core of the suband the sub-sub-sub-sub-sub-sub-substance of the core of the subtant le beneath the surface of the ware Some people have even done excellent por traits with finger paints.

When you have produced a painting with which you are satisfed the next step is to

dry it Lift the paper up by two corners and place it, painted side up, upon a newspaper or a piece of rough cardboard larger than the painting uself. It will take about two hours for the painting to dry. When it is entirely dry, run a hot iron over the back of the paper. This is done in order to smooth out wrinkles and to prevent the edges of the

paint on it, use a paint rag to rub off the paint Also wash the spatulas that you have used and replace the screw tops on the jars of paint Finally wash your hands and arms (and face, if necessar)

Finger paints may be used to decorate a number of different objects. You can put beautiful designs on wooden articles—trays,



White Herous by Xathleen Caffee This beautiful study shows the remarkable effects that can be preduced in the medium of finger painting by mature artists. The artists fingernalls were used freely in this composition

paper from curling The paint will not rub off or peel unless it was not worked in smoothly in the first place

The dred painting will be in a permanent form—that is, unless you apply water to the painted surface. You are assly make the painting waterpool by giving it a coat of clear shellac. If you wish one of your paintings, write one of your paintings, write on the pain side of the date in lead pencil on the plain side of the date in lead pencil on the plain side of the paper before you begin to work, with it In this way you will be able to trace the progress that you have made

When you have finished painting, wash the table top so that there is no trace of telephone screens, book ends and unpainted furniture. The best effects are produced on soft light-colored mood Be sure to work the paint in smoothly. Paint soaks into the wood as it is worked Therefore, in order to get pure color, it should not be worked over too often. By applying shellar, you can make

any finger painted wooden surface washable In making desk sets, blotter covers, port lolios and scrapbook covers, cardboard can be used as a base on which to paste finger painted paper, or else the painting can be done directly on the cardboard The edges are more attractive when bound with black or colored passe partout. (Passe partout is a s rong gummed paper, used especially for

mounting pictures )

Finger painted wastepaper baskets are very attractive Make the pattern and trace the outline on cardboard Paint directly on the cardboard When the paint is dry cut out the basket Passe partout can be applied along the edges if desired Join by lacing through punched holes or by means of brass fasteners

It is interesting to note that while finger painting for beginners is something quite new the use of one s fingers and hands in applying ordinary paints goes back several hundred years This type of painting was developed in China by a famous artist called Kao Chi pei who died in the year 1739 Ac cord ng to the story kao used to paint with brushes I ke all the other artists of his day He became so successful that he could not find time to finish all the paintings that rich Datrons ordered

ame into One day one of he e ratron hao's studio and told hin that hin ust finish had or at once a painting tha h pat dered kao repled 1 k kl n that led n if he insisted on having a l w u l ha e such a very short time the t to work with h s f ngers \i l ĸ 1 hs his paints and began to ar ply il e fingers To his surprise he p odu mastern ece which the a 1 5 Da and the general public too greal ad

Many of Laos patrons 10 having the artist do finger pa nt ng frtl too It is said that in the course of the ka abandoned his brushes altogether and used only his fingers in his painting A number of Chinese artists have tried their hand at fin ger painting since Kao's day This Chinese art is called finger tip pa nting. The paint used is like an ink unlike the Shaw finger paints it can not be rubbed out and painted over and over until the result is satisfactory

## CHARADES

A CHARADE is a puzzle the solution of which is a word of two or more sylla bles Each syllable is given to the solver by means of a description or by acting out a scene By putting the syllables together you will have the desired word For example suppose you have the following descriptions "My first (that is the first syllable) is a beast of burden my second is a place where a river may be crossed with ease my whole (that is the whole word) is a place of learn ing Here is the solution the beast of bur den is an ox the place where a river may be eas ly crossed is a ford the place of learn ing is Oxford

Can you solve the following charades? They are really ou te easy If you can not guess the first syllable try the second it may give you the necessary clue to the word The answers are given upside down on page 374

I My first is a place where travelers stay If you have my second you're very Wise

You li find my whole where people pray Its fragrance rises to the skies

2 My frat is never short My second has many a port My third is neither a woman nor a child

- My whole you'll find when goods on docks are piled
- My frsts a favorite fish that's found right off the coast If you do my second you have no cause
  - My whole is pleasing in the noonday sun But sometimes when it's cast our joy is
- 4 You use my first to make the things you
  - You sometimes climb my second to fill My whole arranged in rows in order
  - Contents the appetite and quenches
- thirst 5 On my first you ll take a ride With my second by your side
- When you come home unfeeling soul I fear you ll trample on my whole
- 6 My first's a tiny creature busy as can be My second a famous boat in days of

My third on many a cot or bed you'll see My whole's a place where you can t shun the cold

7 My first belongs to womankind My second guards you well from cold My whole I m very sure you II find Always alone and often old

8 My first is oft a stone My second s one letter alone My third is you and I My whole will make you cry

## HOW TO TELL A PERSON'S AGE

WE are going to begin by giving you what seems to be an ord nary table of figures. As you see there are six columns

of figures in the table the numbers range from 1 to 63 and they follow in order in all three of the columns

	1	3	4	8	16	32
	3	ž	5	9	17	22
	5	- 6	ş	10	17	11
	3 5 7	7	7	11	19	27
	9	10	12	12	20	33
	11	11	13	13	21	33 34 35 36 37
	13	14	14	14	22	3/
	15	18	15	15	23	38 39 40
	17	18	20	24	24	39
	19	to	21	25	25	- 10
•	21	22	22	26	76	41
	23	21	2.3	27	27	42
	25	26	28	27	28	43
	27	27		20	29	44
	20	30	30 31 36	30	-29	45 46
	31 33	3.1	21	31	30	40
	33	31 34 35 38 39 42	36	40	31 48	47 48
	35	15	30	41	40	48
	37	28	37 38	42	49	49 50 51
	39	30	30	47	50	50
	41	41	39 44	43	51	51
	43	41	77	44	57	52 53
	45	43	45 46	45 46	53	53
	47	47	47	40	54	54
	49	50	52	47	55 56	55
	Ší	51	53	56	50	55 56
	53	54	54	57	57 58	57
	55	54	34	58	58	58
	57	55 58	55 60	59 60	59 60	57 58 59 60
	50	59	ő;	61	bo .	60
	59 61 63	62	62	91	6ı	61
	61	63	63	62	62	62
	-5	٠,	03	63	63	63

Yet this is no ordinary table for with it you will be able to tell the age of any person from one to sixty three years old—quite a range of ages with which to work

This is how you use the table Suppose that you want to find out the age of a friend Show h in the table of figures and ask him in which column or columns his age is given

Then add up the figures at the top of these columns and you will have the answer Let us take a definite example. Mr. Jones who is 25 years old will tell you that his age is listed in the first fourth and fifth columns. The figures at the head of these columns are 1.8 and 16. Added together they give 25 that is Mr. Jones's correct age.

## ANSWERS TO CHARADES

(4) Panity (pan itee) (5) Carpet (car pet) (6) Anisaciac (ant ark inch) (7) Her mut (her mutt) (8) Piteous (pit e us)

Here are the answers to the charactes (1)

Hornes (nu sense in (2) (as ness nu) senson

Im (ano-bads) wobads (5) (nem-anotes guol)

## HOW TO MAKE AN **ELECTRIC**

WE are going to show you how to make an electric motor that is designed to operate from a single dry-cell battery It is made from inexpensive materials and is quite easy to build If you follow instruc tions carefully, you will have a motor that will really run At the same time you will

MOTOR

have learned just what makes your motor MATERIALS REQUIRED Figure 2 shows the materials that you will need They

melude

t wood block 25%" x 4½"
t wood block 4½" x 6"
(Both blocks should be cut from soft pine wood preferably 3.4" thick. Grain of wood should run with the longest dimens on of each piece) 1 11½" length of ½" thick x ¾" wide soft fron

(stop steel)

1 134" length of same fron as above I 16 penny common spike nail (110n)

2 henry common suls (1ron)
2 he styl common suls (1ron)
1 henry common wappung strong
1 henry common wappung strong

1 4 lb Coil No 18 Bell Wire (annunciator wire)
75 4ll in one length
1 13/2 volt dry-cell battery (No 6 preferred)

BASE The large wooden block is used for the base of the motor and requires no further

BEARING BLOCK The bearing block should be made from the small wood block as shown in Figure 3. The notch in the bot tom 34 wide by 36" deep should be just large enough so that the iron can pass through. through



FIELD POLES The long piece of iron is to be bent to the shape shown in Figure 4 First find the center of the iron and mark a line with a pencil 11/2 each side of the center. The part of the iron between these lines will form the flat 3 section at the bot times will form the nat 3 section at the not tom. Then bend the iron between the two pencil marks and the ends of the iron keep ing the dimensions as close as you can to those in the diagram

You can bend the iron with a hammer on a block of wood or else you can put the iron in a vise, and use a monkey wrench forming the iron around a rod or pipe The bent iron need not follow the pattern ex actly However the space between the poles (the ends of the iron) must be two inches and each pole must be two inches from the bottom

ARMATURE IRON See Figure 5

ARMATURE SHAFT The spike to be used for the armature shaft should be per fectly straight Remove the tool marks from the head with a file or with emery cloth Also remove any rregularities or enlargements near the point of the spike

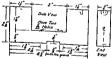
ASSEMBLY The field pole iron (the long bent iron) is to be set in place in the notch



2. Materials required to make the electric motor

on the underside of the bearing block. Then the bearing block is to be attached to the base by means of the two No 8 wood screes. (See Figure 1) Two 4 penny nails are now to be driven in the base, by from both the ron and the bearing block as shown in Figure 6. Note that these nails are on the side of the field pole iron that is nearer the point of the spike

Next we make the armature bearings. These are bollowed out places in which the spike containing the armature uron will turn I rast lay a spike across the bearing block so that it will be in the exact center them mark the location for the head and the point the spike. (Note The field pole iron is closer to one bearing than the other The



3. How to prepare the bearing block

bead of the spike must be on this closer bearing. Heat the spike and burn in the head into its block. Do the same with the head into its block. Bo the same with the spike has burned a bearing as deep as the spike has burned a bearing as deep as the spike has burned a bearing as deep as the idameter of the spike. Rotate the spike while burning. After burning, and a few drops of light of Figure 9 shows how the bearings will look when your task is completed

WINDING THE FIELD COILS. With the field pole iron in place, wrap the places where the coils are to be located with friction tape (See Figure 6) An 18" length of tape is required for each pole At each turn the new layer of tape must cover one-half of the last layer

We are now ready to wrap the wore (No 8 Bell Wure) nound the laped part of the store 18 Bell Wure) nound the laped part of the store 18 Bell wire) and the store 18 Bell wire 18 Bell wire

Before the last three turns are applied at the top put a r" length of tape under the wire, folding the tape back over the windings



when the return layer is started Add the second layer, laying the turn as closely as possible until you reach the base again. This should take about 36 turns. Lay on the third layer up, and the fourth layer down Each will take about 30 turns, making a total of about 136 turns It is not necessary to have exactly 136 turns, a few more or less will do no harm.

After completing the winding process, leave 12" of wire-the finish wire, as it is called—and cut off the set. the finish wire should be wrapped account of the set of the finish with should be wrapped account to the hase, 1/" from both the iron and the bearing block. This nail serves as a brush holder, and the end of the wire, with the misulation removed, forms the brush. The brush should point upward, as shown in Figure 8.

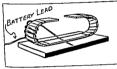


f How tape is wound around the field pole irea.

The winding for the other pole is applied in a similar manner, allowing a 12" battery lead and winding in a clockwise direction The finish wire, 12" long is to be wrapped around the other 4 penny nail, the brush part should point upward. The two brush wires are spaced about 38' apart at the top Figure 9 shows how the field pole iron will look after the winding is completed with the brushes in place and the battery leads connected to the terminals of a battery

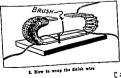
PREPARING THE ARMATURE We are going to prepare now what is called a two pole armature First drive the spike through the hole in the armature iron (Fig ure 5) The head of the spike should extend 138 from the armature iron Next we make the commutator At a distance of 23%" from the head of the spike, wrap four layers of 34" wide friction tape around the spike

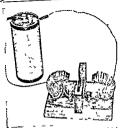
We now make the bars for the commuta tor (Figure 10) The two bars are made of



7 Wrapping wire around the taped part.

a single 3" piece of No 18 wire, which is prepared as shown in B, Figure 11, by means of a pair of long nose pliers. Then the wire is bent and set on the commutator, as shown in C, Figure 11 Note that the two bars are opposite each other on the commutator, also that the central part of the wire is bent back so as to clear the spike The bars should be





The field pole iron after winding is completed

located on the commutator so that they are in line with the leading edge (the longer edge) of the armature iron as shown in Fig ure i The bars are kept in place by means of string as indicated in Figure 10 Their overall diameter should be 7/16 When the armature is in the position shown in Figure I the brushes should make contact with the bars

HOW TO START THE MOTOR Con nect the battery leads to the terminals of a dry-cell battery and give the armature iron a turn or two by hand This will start your motor going and it will continue to run as



long as you have it connected to the battery More than one dry cell can be used if they are connected in series the motor will run faster and will be more powerful You will be able to operate toy machines with it by using a rubber band for a belt

WHAT MAKES THE MOTOR RUN? Suppose that the brushes of our motor are making contact with the commutator bars as shown in Figure 1 As the electric current passes through the coils of the field pole iron, it becomes a magnet. The north pole of this magnet will be opposite the north pole of the armature iron which will also be magnetized. Since like poles of magnets repel each other the armature will start turning

As the armature moves the brushes love contact with the commutator bars the cr cut is broken and both the field pole iron and the armature iron love their magnetism since no current is passing through the coil. But the momentum of the armature keeps it turning until the brushes make contact again with the commutation bars Again the field iron and the armature are magnetized again like poles are brought into contact and repel each other and the armature continues to ourn. This process is repeated as long as the electric motor is connected to the bat

Article and illu trations prepared by the West inchouse Electric Corporation

#### A USEI UL BOOKSTAND

THE bookstand described in this article is quite easy to make Figure 1 shows how it will look when it is completed Figure 2 when the necessary working drawing. The dimensions of each part of the book stand are given in the drawings If you would like to have a smaller of larger stand change the dimensions accordingly.

You may use a hardwood like oak beech or birth for the bookstand. However, such woods are rather difficult to work. A soft wood such as pine or spruce is easier to handle. After the stand is completed it may be stained to juntate any of the more expen.

sive and harder woods

The first thing to do is to cut out to the exact dimensions the various pieces of wood required for the stand. These pieces will in clude the four legs the rails or crosspieces connecting the legs five shelves eight slats four on each side. After cutting the pieces finish them carefully with a plane so as to have them smooth and true. Then rub them with sandopsets.

The legs must be strong the finished size should not be less than 1½ inches Earls side piece is to consist of four slats fitted into the date rails by means of slots cut into the rails. The shelves and rails are to be fitted into the good the bookstand by means of mortise-good the consistency of t

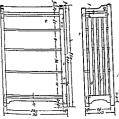
When all the pieces base been prepared we should first put together the side pieces, consisting of the slats and cross rais. The slats are fitted into the appropriate slots after the parts which are to come into contact have been given a thin coat of wood give When you have funded a side piece.



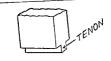
This is the bookstand described in the article bearing drawings are given on the next page

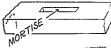
place burlap or a similar material around the top and bottom rail so as to protect the fin ish. Then wrap cord around them in order to keep the various parts of the assembly under pressure until the wood glue has had a chance to set

When the side pieces have been completed you are ready for the final assembly Vortises and tenons should be coated with wood glue before being set in place When the assembly has been completed keep it under pressure until the glue has set



rking drawings to be used in making the book Left front view Right side view





3. Details of mortise and tenon onstruction If you have used a soft wood it may be

stained any appropriate color Mahogany rosewood walnut and ebony stains are all very effective Give at least two coats of the stain which is to be applied with a brush If you wish to give the hookstand an extra fine finish you may apply French polish after all is dry When the bookstand is fin ished you will have an article of furniture of which you may well be proud

## A PROBLEM FOR YOUNG DETECTIVES

MR TAYLOR the owner of a factory was about to leave on a business trip on October 1 1945-it was a Monday He was very much surprised to see Jack Smith the night watchman enter his office. He was even more surprised when Jack begged him not to take this trip

Why not? asked Mr Taylor Because last night I had a terrible dream You know, Mr Taylor I always have my one night off on Saturday Well I dreamed that it was Saturday and that I had gone to the movies in the even ng to see the last show-I always do that on Saturday I no t ced that an old man with a flowing white beard was sitting next to me Suddenly he turned to me and said Tell Mr Taylor not to take that trip on Monday or he will surely die Then he jumped up and before I could say a word to him he had left the theater I rushed right out after the old man but by the time I reached the street he had d sappeared None of the bystanders had seen a man with a white beard leaving the moving picture theater

I remember that in my dream I was very much worried I begged you not to leave on your trip but you only laughed at me Suddenly I found myself standing by a rail way track A train came speeding by No sooner had it passed me than it left the rails and soon it was a mass of wreckage I ran up to the scene and saw you lying dead by

Please Mr Taylor don't gol I know the tracks that this dream was meant to serve as a warning to you Something terrible will hap

pen to you if you go today Mr Taylor paid no attention to the warn ing of the night watchman He left on his trip as he had planned There was much any lety among Mr Taylor's employees because the night watchman told everybody about his dream To everybody s relief Mr Taylor returned safely from his trip-and promptly discharged the night watchman

Why? With the clues that we have given you above you should be able to tell We give the answer in upside-down type on page 384



I It is easy to make this attractive apron

HERE is an apron which is very easy to make and yet is pretty and practical, as Eguire 1 shows. The amount of material to be used will depend upon the size of the gril for will need about 34 of a yard of material, 35 inches wide. The appron will look well in a flowered, plann or checked cotton fabric.

### STITCHES TO BE USED

(1) Back stitch (for seams and for join ing pieces together) Take a small stitch Take a second stitch back over first one bringing the needle to the right side of your material, the length of the first stitch that was taken

(2) Hand hem (for hema) Fold material to with needed for hem, allowing a lattle so that the edge of the material may be turn so that the edge of the material may be turn so that the edge of them with fingermal so as to make a crease, pun the hem down Then began the hand hem Take a single the beautiful to the solution of the

## HOW TO MAKE AN APRON

#### TOP PIECE

With a tape measure take the measure from the waistline (or from the belt or sash of the dress) to the base of the neck. Cut out a square piece of cloth, each side of which will have the above dimension Make a ½ inch hem on all four sides, using the hand hem

#### BOTTOM PIECE

Measure from the waustine down to the bottom of the dress Add 1/2 inches to this Then resure around the waist from one stem eresure around the waist from one Cut out a piece of material using these two measurements Make a ½-inch hem on all four side, as for the top piece

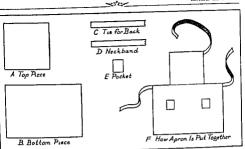
Join the top and bottom pieces together, putting the bottom of the top piece under the top of the bottom piece (See I, Figure 2) Use the back statch

## TIES FOR BACK

Cut out two strips of material 23/2 inches wide and long enough to tie into a bow in the back when somed to the upper edges of the bottom piece Fold each strip down the center of the length so that the strip will be half as wide as before, but of the same length Using a back stitch, sew the edges of the long side together, also sew together the edges of one of the short sides Turn the strip inside out so that the seams will not show Turn in the material 1/2 of an inch on the other short side, and stitch the edges together When both strips have been pre pared in this way, join them to the bottom part of the apron, as shown in I, Figure 2 Use the back stitch

### MECKBAND

Passing the tape measure around the neck, measure from the top tiple edge of the top piece of the aproin to the top left edge. Add a mehes to this measurement. Gut a strip of this length 2½ inches wide and prepare this strip as you did the ties for the back. Now join the neckband to the upper left edge of the top piece. Place the neckband under this



2. This drawing shows the various parts of the apren and also how the apren is put together

top piece as far as the hem, and sew it down with the back stitch. Sew on part of a snap on the other end of the neckband Sew the other end of the snap on the top right edge of the top piece, setting the snap on the hem POCKETS

Cut out two pieces of material 4 inches by

a mches Make an inch hem on one side this is to be the top of the pocket Hem un der the other three sides 1 s of an inch Then sew the pockets to the bottom part of the apron Place the bottom of each pocket half way down the bottom part of the apron and halfway between the end and middle of the apron Use the back statch

## A RECIPE FOR PINWHEEL COOKIES

OU will need

teaspoonful bak I cupful butter or I ing powder other shortentablespoonfuls ing milk 1/2 cupful sugar

square unsweetegg yolk T ened chocolate 11/2 cupfuls flour

18 teaspoonful salt

Cream the shortening that is work it with a fork until it is light and fluffy It will be easier if the shortening is at room tem perature when you begin Add sugar gradu ally and continue working the fork around until shortening and sugar are well blended Beat egg yolk slightly and add to sugar and shortening Beat mixture well

In another bowl sift flour once, measure add baking powder and salt and sift again

Add this mixture to the first gradually put ting in some milk each time and mixing well after each addition

Divide dough into two equal parts put ting each in a separate bowl Melt the choco late in the top part of a double boiler and add it to the dough in one bowl Mix the dough and chocolate thoroughly

Put both bowls in the icebox for several hours Remove and work each batch of dough into a rectangular sheet 1/8 inch thick Place the plain sheet over the chocolate sheet and roll both up as for a jelly roll Put roll in wax paper and return to icebox for several hours, or overnight

Remove from wax paper and slice the roll making slices 1/8 inch thick Place on greased cookie sheet and bake in a moderately hot oven (375° F ) for about ten minutes

[ 381 ]



## MINIATURE ZOOS AND GARDENS

## By Thomas Gordon Lawrence

OW would you like to have in your own home a tiny jungle or a dwarf-cactus garden a refuge for tree frogs or a laboratory where you can study the fascinating habits of ants? All that you have to do is to con struct an appropriate terrarium (pronounced teh rayr in um, the plural is terraria) A terrarium is an enclosed place where you can keep living things It is much like an anuar rum except that instead of being filled with water it is intended for plants and animals which live on land

Let me tell you about a terramum which a girl once made in a glass tumbler. In this she kept half a dozen coleus plants and orange seedlings alive for two years! Before plant ing the coleus and baby orange trees she nut about an inch of brightly colored pebbles in the bottom of the glass and then put a half inch layer of soil and sand on top of the pebbles

In order to have a "lawn " underneath the plants she placed a little piece of moss covered wood on the soil. To have some and mal life in the terrarium she captured balf s dozen tiny white insects called springtails which were hopping merrily over the wood and she put them in with the plants. She set a flat piece of glass over the top of the tumbler and kept it in place by means of Scotch tape She did not water the plants for many months after the first watering had taken place

Two years later all of the plants were still aline The orange trees had grown to the top of the glass (about five inches) The coleus had grown until its stems were bent and twisted, because it had not had enough room in the glass From the sides of the coleur stems delicate white feathery roots grew right out into the moist air, and the moss had grown much larger than it usually does in the woods The original springtails had died of old age but their great great grandchildren still hopped about like little white grass hoppers

Another terrarium which lasted a long time was made by a boy who wanted a home for a horned toad which his father had brought him from Texas A horned toad is not really a toad it is a lizard which lives in desert regions. So the boy decided to make the terrarium as much like a Western desert is he could

He was luck, enough to have an old aguarum two feet long and a loot wide First, he cleaned the aquarum very care fully. Then he put a two mch layer of peb bles and broken pieces of flower pot all over the bottom. Over the pebbles and flower pot fragments he put a thin layer of soil then an unch of clean sand over the soil Here and there he placed particularly handsome stones on top of the sand, and at one end of the ter ranum he piled up a "mountain" of gleam my white pebbles

## "DESERT VEGETATION" THAT A BOY OBTAINED FOR HIS TERRARIUM

Now came the problem of getting the right kind of desert vegetation Fortunately the boy was able to buy some small prickly pear cactus and an aloe He planted these with only a little soil to cover the roots or cut stems He wanted a thicker growth of plants in one part of the terrarium-such a growth as one might see in the brief rainy season in the desert. So he went into the garden and got some weed and flower seeds Some of the small weeds looked quite beautiful when they grew behind glass. The boy did not put any cover over the top of the terrarium as he was not afraid that the borned toad would climb out over the glass side and he knew that it needed a free circulation of air

The terraria that we just described are examples of the two principal kinds—damp and dry The girl had made a damp terrar har the bry ady one. In damp terrar a kept most A glass cover must be provided and must be kept in posts on souther and the provided and must be kept in post mosture. A dry terrarium is not really dry, but it has much less mosture than a damp terrarium bry terraria are sometimes provided with Elss covers sometimes they are left uncovered.

## SOME IMPORTANT RULES TO FOLLOW IN MAKING A DAMP OR DRY TERRARIUM

There are some general rules to follow, whether you are making a damp or dry ter rarium Almost any glass vessel will serveau old drinking glass a glass bottle a glass preserve jar The best thing for the purpose

however is a rectangular aquarium which you can buy in any store that sells tropical fish. In general, the thinner and clearer the glass the more beautiful the plants and ani mals will appear

## IT IS IMPORTANT TO HAVE GOOD DRAINAGE FOR THE PLANTS IN A TERRARIUM

Always put a layer of pebbles or troken crockery on the bottom This all as surples water to drain down and mustres a cupping life giving oxygen for the root of the pebbles for the pebbles of the pebble

Keep the glass so clean that it sparkles Sometimes your terrarium will become far more attractive pare beang a piece of white cloth or white pare beang at The cloth or sper will cause gight to be reflected into the terral region of green algae covers the class, simply wipe it off with a cloth Use white sand or marble chips to cover part of the soil if the terrarium looks dark or dingy Fragments of red brick will also brighten up its appearance

## TOO MUCH HEAT MAY PROVE FATAL TO BOTH PLANTS AND ANIMALS

The greatest enemy of life in a terrarum is TOO MUCH HEAT Keep your terrarum away from het stoves or radiators. If you have any the store of radiators if you have any the store of the summer sun coming in through the window will raise the temperature to such a point as to kill all the summer sun coming in the sum of energy—leaf the sum of the sum of energy—leaf to passes out through the sum of the sum of

When it gets too hot made a terrarium the growth of molds and bacteria is stimulated and the plants lose the terrassiance to fungus infection. Some plant (the most grasses and pune and certar seedings) can be kept inside a closed terrarium only it the temperature inside remain low Otherwise their green leaves become covered with cobwebby mold almost overnight.

The next greatest danger to both plants and animals is one of two opposites TOO MUCH WATER and TOO LITTLE WA TER H your terrarum is a closed one (one with a glass cover on top) you may not have to water it again for weeks or ever years if you put in the right amount of water at first The amount of water you put in depends on what kind of growth you wish and also on whether you want a damp or dry terrarum.

## SOME TERRARIUM PLANTS REQUIRE MUCH MORE WATER THAN OTHERS

If you are going to raise cactus or other succulents (plants with fleshy stems or leaves) in a closed terrarium you should put mery little water so that practically no must not succeed with the put in so that a definite mist forms on the glass whenever it is childed Still more water should be added it you are making a damp terrarium. If you wish to raise delicate mosses and ferras in their greatest beauty of water hang occasionally from the glass cover.

If you have an open terrarum (one with out a glass cover) your must watch it care fully and water it as soon as necessary. If you have a good foundat on of pebbles you will be able to see the water running down between the stones and there will be no danger of the so1 becoming water logged "Soon green algae and perhaps moss will grow between the slones it is not necessary to between the slones it is not necessary to the sone of the sone of the sone of the sone of the sone is the so

The very best plants for a dawn terranum come from the depths of the forest They are the moses ferns and small woodland flowers Cut flowers when placed un a damp terranum will last many days longer than in the open air generally they will be much more beautiful too

Practically all the plants of your garden and the reighborhood roadside will grow in a dry terrarium. The best plants for this purpose however are the prickly pear cartus and the aloe. When we speak of cactus plants we generally have the prickly peak occurs in mind (The eagle on the flag of Mexico spected on a prickly pear ) A good thing about cactus and other succellents is that when you want a new plant all you have to do is to cut off a part of the old one You let the cut base of the stem dry for a day or two then you plant it just barely covering the base with soil or sand

The aloe which is a native of Altrica and Arabia and is related to the bitter aloes men toned in the Bible is perhaps the best of all plants for dry terraria. It has long smooth fleshy leaves with a row of teeth on each side "The leaf holds so much water that if you cut a leaf and squeeze it drops of water spurt out as if from a fountain Aloes produce numerous small plants growing from the base of the old one so that you soon have a number of new plants in addition to the original one.

Some plants are very adaptable and grow well in either a dry or damp terrarium among these are the coleus and the begonia Orange lenno and grapefruit seed ngs will grow beautifully in either dry or damp air but they need a good supply of water for the total control of the standard of the total control of the standard of the standard to the standard of the standard of the beade cactus and aloe on fairly dry sand if grows even better with larger flowers in a terrarium so damp that the leaves of the plant are always beaded with big drops of water

#### ANIMALS LIKE PLANTS, VARY IN THEIR ABILITY TO STAND DAMPNESS

In solecting animals and insects for your terrarium you must remember that like plants they vary in their ability to stand dampness it is unpossible to have the air too most for frogs salamanders earthworms and pill bugs On the other hand sankes lizards and most insects do much better to a rather dry afmosphere For example great and of a in a few days it the air in their terrarium is very most.

## ANSWER TO THE PROBLEM ON PAGE 379

night But it he had a dream on Sunday night he must have been asleep at the time That is why Mr Taylor discharged bun

he know that the night watchman had his one n ght off on Saturday. That meant that he was supposed to be working every other

## THE MYSTERY OF THE DISAPPEARING EGGS

HERE is a feat of magic that will amaze be kind enough to lend us a hat—a mans felt hat or any hat with a deep crown. We set the hat with the brim upward on the table in front of us. Then we pull a handker chef from our pocket and show the audience that it is a perfectly ordinary handkerchef with nothing hadden in it.

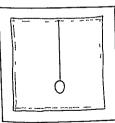
We hold it up by the two upper corners so that the bottom is just about two inches from the brim of the hat We gradually draw the two upper corners together and—wonder of wonders—an egg comes out and drops

into the hat

We straighten out the handkerchief then draw the two corners together again and an other egg drops into the bat. We continue in this way until the hat contains half a dozen eggs. Then we fold up the handkerchief and

put it in our pocket

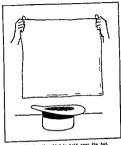
We pick up the hat very carefully bring at the very to the person who lent it to us and their suddenly put it on for him When our friend removes his hat the audience expects to see his hart covered with a wonderful mix ture of egg shells egg yolk and egg white 'Oq at all! The eggs have disappeared from the hat and there is no trace of them What has happened?



I. How the egg is attached to the handkerchief

les of course, this is a trick We shall need not a half dozen eggs but just one—a white one—for our performance. It is to be prepared for the trick in the following way list we pierce the shell at opposite ends

with a darning needle. Then we enlarge the hole at one end by picking away at its edges with the point of the needle, until the hole



2. The handkerchief is held over the hat

has a diameter of 1/6 inch We place the egg over a saucer and we blow through the smaller hole causing the contents of the egg to come out through the larger hole

We now take a piece of white thread about fifteen inches long knot one end and inset the other in a needle We pass the thread through a period when the piece of white paper about you can be super to the piece of the piece of the piece of the piece of the whole when we have passed it through be hole we period by the piece of the

We seem had been dof the thread to the New Seem hadderched as shown in Figure 1 and 1 and



I The two typer course are breach teachers
We perform our truck standing behind a
table. The members of the authence should
be at least three feet away from the other
side of the table or else they may be able to
detect the truck. When we are about to begun
the performance the napkin and egg are
the performance the napkin and egg are
that as our based of our pockets in such a way
that as our based and the such as the such as the
can grasp the egg. Naturally by our must be
careful not to crush the egg.

Concealing the egg in the palm of the right hand we now draw out the handker chief Still keeping the egg hidden we hold out the handkerchief as in Figure 3 we can vince the audience that there is nothing hid den in the handkerchief Still holding out the handkerchief with the prepared side away handkerchief with the prepared side away belief with the property of the handkerchief over the hat with the bottom of the handkerchief about two inches from the brim (Figure 2).

We bring together the two upper corners of the handkerchief as shown in Figure 3. This causes the egg to drop until it is in full stew of the audience under the handler chief We lower the hat until the egg is lying in the bottom of the hat Then we draw apart the two upper corners again and raise the handkerchief until it is again in the postions shown in Figure 2. We repeat the per formance a half dozen times By that time (at least that is what the audience will think) there will be six eggs in the hat

Now we bring together the two upper corners of the handkerchief so as to conceal the egg in the fold. Then we put the handker the f in our pocket. We then complete the performance by picking up the hat and plac

ing it on the owner's head

To present the trick most effectively you should practice it over and over again Of course you must be careful at all times not to crack your egg Professional magicians generally use a celluloid egg for tricks of this kind since it is not so fragile Celluloid eggs are mexpensey. You may buy them at mag c shops and im many stores that specialize in novellies

## THE GAMF OF DOUBLETS

To play this interesting game, we choose two words oppose to or quite different in meaning each containing the same number of letters. Since they come in par swe call them doublets. Here are some examples of these doublets because the same examples of these doublets. Black—white night—wrong good—evil beef—park

The game consists of turning one of these words into the other by changing only one letter at a time thus making a chain of words between the doublets. Following is an example of such a chain

black—white black slack stack stalk stale shale whale while white

You will note that only one letter is changed in each word to make the next Only words that you can actually find in the dictionary can form part of the word chain Again in changing one letter to make a new word in the chain the substituted letter must occupy exactly the same posit on in the word as the letter that he have taken out That is we must not have a chain con taning a series like 'hell earl, lure

## Garden Lover's Calendar

## Combiled by Elizabeth Peterson

## January 1 15

Most house plants require little water dur ing this month However plants should not be allowed to dry out Plants in small pots will probably dry out quicker than those in large pots Those which are growing rapidly and flowering quickly will dry out most rapidly The best test to determine whether or not the plant needs water is to rap the pot sharply if it gives a ringing sound the plant

Seeds which have been left over from the past season should be tested carefully before they are planted A satisfactory way to test them is to sow a few seeds in small flats label ng each kind carefully and also indi cating the number of seeds of each kind that have been sown

#### January 16 31

An occasional sprinkling overhead or d p ping in a tub of water will serve to remove dust from the foliage of ferns grown in the house and will promote their healthy growth Palms should be sponged

Spraying with lime-sulphur (one part lime sulphur to twelve parts water) during warm winter weather is the most effective method of ridding fruit trees and shade trees

of scale pests The following house plants will grow well in a warm room palms ferns cactus plants and fig plants They grow best in a tempera ture of 65 to 70 degrees in the daytime and 60 to 65 degrees at night

#### February 1 15

Begonia plants should be potted in February or March Place a dash of sand under each bulb place the pots in a box of wet ashes or sand extending to the rims of the pots and put away in a cool part of the cel



lar When the plants show signs of growth bring them into the light but do not supply them with too much water until they become well rooted

## February 16 28 (29)

Twigs of the willow maple elm hickory cherry and crab apple may be brought in doors for winter decoration

Daffodil bulbs that have been forced dur ing the winter should be planted as soon as

the frost is out of the ground Keep window boxes that are filled with evergreens well watered during the winter months Even if ice forms around the plants no harm will be done to them

#### March I 15

It is best to repot palms and similar house plants at this season so that they will be ready to make their annual growth in the summer Use a pot one size larger Ram the soil around the edges very tightly with a stick-so tightly in fact that the pot will not drop away when the palm is lifted by

its leaves Plant dahlia tubers in peat moss and as soon as the sprouts have made several inches of growth cut them off and set them in sharp sand

## March 16-31

As soon as all danger from frost is past remove the dead leaves and stalks from around the perennial plants (plants which continue to live from year to year) Spray new growth with Bordeaux mixture to pre-

vent fungus disease

The seeds of slow growing annuals (plants that live only for one growing seas n) such as zinnias pot marigolds petunias asters and heliotrope should be started in boxes of earth or in pots in the house or ele in hotheds

I rune old rose bushes when the weather is not too cold cutting away all dead wood

## 1 pril 2 2 c

All early sown plants should be hardened off in the cold frame before they are moved to the open ground Clean the lawn of weeds fill in the holes

with fresh soil and seed over all the bare spots Perennials should be planted as soon as

they can be handled in workable soil Stake and wire newly planted trees to

prevent them from swaying in high winds Water all newly planted trees and shrubs at frequent intervals

## 1 pril 16 30

Do not scrape the bark of trees to destroy injurious insects for great damage may be caused to the cambium layer

Pansies dais es and forgloves that have been carried over the winter in cold frames can be moved into beds or borders now to make room in the frames for the early plant ing of the tender perennials

With the exception of the magnol a which may be moved in May all deciduous trees and shrubs (that is those that lose their foliage every year) should be transplanted as soon as possible

### May 1 15

Evergreens can be transplanted later than deciduous trees but do not neglect to soak them with plenty of water every other day for several weeks after they have been moved

Peonies require plenty of water while the buds are being formed early in May A spray of one pound of blue stone and one pound of lime to fifty gallons of water applied when the buds are the size of buckshot will prevent blight and early applications of bone meal will supply nourishment

#### May 16 30

Best results in destroying weeds are obtained by sprinkling a good weed killer over walks and drives and washing it in with the hose It is better to soak the paths or roads with water before applying the weed killer or else to apply it after a heavy rain

Daily sprinklings of the lawn will bring the grass roots to the surface of the soil It is better to give the lawn less frequent but

heavy soakings

Bone meal can be used with good effect around perennials including roses. The lat ter respond well to applications of liquid manure when they are coming into bloom

## June 1 15

June is the ideal month for planting dahl ias either tubers or green plants. The clumps should be separated leaving a part of the neck with an eye on each tuber and the tubers should be planted six inches deep on

Petunias and forget me nots make good fillers for rose beds because they do not draw much nourishment from the soil

If peony buds are cut off before they break open and placed with their stems in deep water in a cool cellar they will form better flowers The buds should be soft to the touch when they are cut

## June 16 10

Cut off the old flower heads on blacs and break off those on rhododendrons without removing any of the branches

The following annuals make good potted plants for porch or terrace decorations pe tunias annual larkspur snapdragons helo-

trope and mignonette

I lants with I ce on them should be sprayed with a nicotine preparation. This should be done as soon as the insects have been noticed on the plants

Spray evergreens with 1 me sulphur

## July 1 15

Thin out the old wood of shrubs that have finished blooming

Stake tall perenntals before they begin to bend and break Tie them with raffin or keep them confined in wire hoops Lawns should not be cut as closely now

as in the spring Remove clippings as they mat between the grass and hinder growth Sweet peas will continue to flower if no blossoms are allowed to go to seed if they are well watered and if they are heavily mulched to keep the ground cool (A mulch is a covering of straw, leaves or other sub-stance spread upon the ground to protect the roots of plants )

#### July 16 31

The tarnish plant bug that punctures the growing tips of asters in hot weather can be kept in check with a tobacco spray or by dusting with air slaked lime

To rid nasturtiums, sweet peas and golden glow of the pest called the aphis, spray with

a nicotine preparation

The best way to obtain winter blooming geraniums is to start slips or cuttings in June er early July Grow the plants in pots shift ing them to larger pots as they develop

August 1 15

Crab grass, worst of all lawn pests, will be seeding soon Rake the lawn before mowing to bring up all seed stalks so that they may be cut off Sweep off all lawn clippings where

crab grass is present Hardy fall chrysanthemums will flower best if they are heavily watered and well fed with hould manure or other fertilizer

## August 16 31

Water all plants during a period of drought until the ground is saturated not less than four inches in depth. Never spray them when the temperature drops suddenly or when northeastern winds are blowing for

th's causes mildew

Take cuttings of English ivy, poinsettia and heliotrope and pot them up for house plants for next winter

## Settember 1 15

If hly-of the valley plants have become overcrowded the entire bed should be dug up at this time and the larger pips or roots reset two or three inches apart and just un der the surface

Divide and plant peonies this month so that they will become well established be fore the bad frost Select strong divisions with three to five eyes and set them with the topmost eye not more than two inches below the surface

Withhold plant food from the rose garden from now on, but keep the soil well mulched

## September 16 30

Chrysanthemums should be staked given liquid manure and sprayed or dusted with a nicotine preparation

Dwarf asters may be taken from the garden and set into small pots for flowering in the house The ground around these plants should be thoroughly watered an hour or two in advance and the pots should be placed in

a sunny window

Purchase house plants from the florist as soon as possible so that they will become gradually mured to the dry house air while the windows may still be left partly oper to admit fresh air

## October 1 15

Tulips daffodils and hyacinths which are to be forced indoors must be buried in a trench outside or kept in a cold frane or a cool cellar for several weeks until root growth has been started

Be sure to plant bulbs right side up Most spring blooming kinds have a pointed top and a kind of ring at the bottom where the roots were attached Lily bulbs have scales pointing toward the top and should be tilted slightly so that water will not lodge in the scales and cause them to rot The bottom of a crocus bulb is slightly depressed

### October 16 31

Several of the ferns which grow wild in the woods make very good house plants They should be taken up after the frost has destroyed the tops but before the ground has been frozen It is best to leave them in a large pot until they freeze solid and to take them indoors early in December

Rock gardens may be constructed at this late date but it is advisable to delay plant ing until next spring This will give the rocks and soil a chance to settle so that when the plants are set out there will be no air pock ets to dry their roots Rock gardens recently planted will need careful winter mulching with salt hay evergreen boughs and the like

## November 1 15

After the hardy chrysanthemums are through flowering cut them back to within a few inches of the ground If this is done heavy shoots will appear in the spring these will be excellent as cuttings

Bulb plants and perennial borders should not be mulched until the ground is well frozen Otherwise a nesting place for mice will

be provided

This is the ideal time to plant tulips Cover them five inches deep space the bulbs five inches apart Do not locate beds of bulbs under eaves or where water will col lect during the winter months

November 16 30 Cover the bulb beds with a light litter when freezing weather has set in Crocus bulbs should not be too near the top or thes will heave and will be easily dug out by mice

Stagmant surface water from melting snow during winter months is dangerous to per ennials. This condition may be prevented in many cases by digging shallow ditches to carry off this surface water

Windbreaks to be set around rhododendron beds and exposed evergreens should be put in place before the ground freezes stretched over wooden frames are desirable

#### December 1-15

Seeds collected from the garden must be kent dry over winter Stout paper bags or envelopes are best I ach of these should be plainly marked and arranged alphabetically in boxes

When the ground has become stiffened with frost, give all evergreens especially those transplanted late this fall, a heavy mulch of straw or well rotted manure Heliotrone seed may be sown this month.

it will germinate very slowly

#### December 16-16

Tubbed has trees, box bushes and hydranreas are best stored in a dark, cool well ventilated cellar that is frost proof Water them only occasionally

Libes, bulbs and rose beds should now receive their winter mulch Cover with peat

moss or buckwheat hulls All earden statuars that is movable should

be stored away Otherwise it should be con ered over with watertight boxes, particularly if it is of soft stone This article is printed by permission of Swift and

Company Chicago, Ill nois.

## A NATURAL HISTORY QUIZ

- (1) Do fish sleep with their ever open? (2) Does the kanguroo run when it is frightened?
- (3) "Among the insects that feed on other insects are the dragon fly the giant water bug the spider and the wasp. What
- is arong with this statement?
- (4) Is the mane of the bon lighter or darker than the rest of its body? (5) Is there a bone in the trunk of the
- elephant? (6) Is the horned toad a frog2
- (7) What insect keeps a herd of cows
  - (8) What large ammal is dumb? (o) Does a porcupine throw its quills
- and milks them?

- when it is attacked?
- (10) What member of the cat family is trained to hunt like a dog?
- (11) (ould you take a ride on a sea horse? (12) 'The clothes moth ents woolen
- clothing ' What is wrong with this statement? (13) Can you name a large town in antiq
- uits that was set on fire by fireflies? (14) What tree is grown to provide food
- for an insect? (15) When is an artichoke not an arti
  - The answers to the above questions are given unside down on this page

## ANSWERS TO NATURAL HISTORY QUIZ

pers taste very much like artichokes brant is a sunflower, but its potate like tu (12) When it is a Jerusalem artichole This ight (14) The mulberry tree The silknorm ment is suride its body, besides, it is a cold to and thing yor one thing, the light of the susmer is 'Not" Fireflies could not set fire rue wrugieze Forug of the moth (13) the the moth that eats garments, it is the larie ausbed nee that of a horse (12) it is not No, the sea horse is a tmy fish with a head (11) stout in tew sign in bonien st it asi

cupine can not throw them, (10) The chee-The quills come out very easily, but the poron the hones dew (8) The gualle (9) No hind part of the aphid a body The ant feeds stance, called honeydew, coxes from the an aphid with its antennae, a sweet subrecb , gocra , of abrida // hen an ant strokes horned tond to a lizard (7) The ant Anta Darker (5) No, the elephant s trunk is bounds. (3) The spider is not an insect (4) closing them (2) No it moves by leaps and (1) Jest pecause spea passe no way of

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Alexander, Sir Harold R L G (1891 ), governor general of Canada During the war he served as Allied Supreme Commander in the Mediterranean theater, where at one time he had a Canadian corps under his command He was the last man to leave Dunkirk when the British and French troops were evacuated in 1940 A son of the Earl of Caledon, he was educated at Harrow and Sandhurst and served in France

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Arnold Henry H (1886 ) command ing general of the United States Army Air Forces During the war he served as a member of the Joint United States Army and Navy Staff and of the Com-bined Chiefs of Staff of Great Britain and the United States He entered the newly formed Air Force in 1911, and was taught to fly by the Wright broth ers Late in 1945 General Arnold was awarded the Hubbard Medal for out standing work in geography and Lord Halifax, British Ambassador, presented him with the Order of the Bath, one of Great Britain's highest honors

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radioactivity, 234 44 Attlee, Clement Richard (1883- ), prime

minister of Great Britain and leader of the Labour party From the beginning of the Churchill Coalition Government in 1940 until its defeat at the polls in 1945, Attlee held a number of impor-tant posts in the Cabinet-Lord Privy Seal, Secretary of State for Dominion Affairs Deputy Prime Minister and Lord President of the Council On his election, he pledged that British for eign policy on international co-opera tion would not be changed He was

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Bartók, Béla (1881 1945), Hungarian composer Outstanding in the field of modern music, he was a leader in the re bellion against the more romantic traditions of nineteenth-century music He studied in Budapest and while there wrote his Kossuth symphony, celebrating the great Hungarian hero At the same time he became deeply interested in Hungarian folk music, accumulating a tremendous collection, which in time influenced his own work. It led him to the use of new harmomes and the adontion of a twelve-tone scale. He chose exile in 1940, and his last five years were spent in the United States Bascom, Florence (1863-1945), American

scom, Forence (1863-1945), American geologist She was associated with Bryn Mawr College from 1895 on, returning as professor emeritus of geology in 1928. An authority in her field, she contributed to the contributed of the University of Wiccosan, and later treceived the degree of Ph D from Johns Hopkins University, the first woman ever to receive this honor from that institute of the honor from that institute his honor from that institute.

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Blamey, Thomas A (1884-), commanding general of the land forces of the United Nations in Australia during the war, under the supreme command of General MacArthur He was present at the formal surrender of Japan aboard the USS Missouri, September 2, 1945, and signed for Australia Late in 1945 he retired as chief of the Australian.

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Bong, Richard (1992, 48), 100 American ari acc of World War II He flew more than 500 combat missions against the Japanese and shot down forty Japanese plaines during two years of Pace Bumark Sea, Oro Bay, Bina, Weral, Lae, Rabaul, Huon Gulf and Leyte Born and brought up on a farm near Poplar, Wisconsin, he won his writer at Lipe the left, Phoems, Arturnal decorations included the Congressional Wedal of Hooro Death came when a Wedal of Hooro Death came when a

Medal of Honor Death came when a jet plane he was testing crashed, in California

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Munfordville Kentucky and gradu ated from West Point During the Aleu tian campaign he received the Distin guished Service Medal and rose to the rank of lieutenant general Buddhism

the Aleutian Islands He was born in

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Business as economic organization 113 15 co-operation in industrial relations 03 co-operative movement, 96-98 storekeeping 292 300 world trade 213 20

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338 40 Byas Hugh (1875 1945) foreign corre spondent and an authority on Japan As Tokyo correspondent for the Lon don Times and the New York Times from 1926 to May 1941 he was an eyewitness and faithful reporter of such events as the conquest of Manchuna and the war in China He was born and educated in Scotland and early became associated with British newspapers He first went to Japan in 1914 and alto gether spent twenty five years there.

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45) commander of the Third White Russian Army His troops were the

Chemistry chem cal elements 44 53 Cherniakhovsky, Ivan Danilovich (continued) first to set foot across the border of Germany proper, in East Prussia, where he received the wounds which resulted in his death. He was the youngest gen eral and Army Group commander in the Russian Army, and helped to drive

the Nazis out of White Russia Chiang Kai shek (1886 ) president of the Chinese Republic, and of the Kuo mintang China's chief political party The defeat of Japan left China a very much divided country, and conflict con tinued between Chiang's government and the Chinese Communists Toward the end of 1945 he called for a meeting of the People's Consultative Council an all party group to be held in Janu ary, 1946 It was hoped that this meet ing would end China's internal strife Chiang was associated with Dr. Sun Yat sen, who established the Chinese

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bership in the House of Lords with it. Clark, Mark W (1896 ), head of the ), head of the United States forces occupying part of Austria He is best known for the thrill ing exploit in which he led a secret mis sion to get information in North Africa in preparation for the Allied invasion in

Clark, Mark W (continued) 1042, and as commander of the Fifth Army which fought its way north through Italy He was born at Madison Barrack New York, and graduated from West Point Climate

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Cregar, Henry Duncan (1888- ), com manding general of the First Canadian Corps overseas From 1040 to 1943 he was chief of the Canadian General Staff Hamilton, Ontario, is his birth place, and during World War I be rose to the rank of lieutenant colonel fre has since held important positions in the Canadian Department of National Defense and was commandant of the Royal Military College at Kingston when the second World War began

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Crow Carl (1883 1945), American journal ist and author of a number of well known books on the Orient He first went to China in 1911 as associate city editor of the China Press Shanghai and from 1919 to 1937 he owned an advertising agency there His books were written out of this experience The first of them to become a best seller was Four Hundred Million Customers pub

lished in 1937 Crucible process steel manufacture, 171

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Cunningham Andrew B, Sir (1883 )
Admiral of the Fleet First Sea Lord and Chief of the \aval Staff since 1943 He was commander in-chief of the Al hed naval forces in the Mediterranean during the North African and Sicilian campaigns Cunningham Alexander and Tedder were the commanders respec tively, of the sea land and air forces under the supreme command of Gen eral Fisenhower Cunningham served through World War I and commanded the British fleet in the Mediterranean from 1939 until the collapse of Italy

Cunningham, John H D C Sir (1885 )
commander in-chief of the Allied fleet in the Mediterranean In August 1943 he had been placed in command of the British fleet in the Levant and in Oc tober, 1943 he replaced Admiral Sir Andrew B Cunningham (a distant cousin), listed above Sir John entered the Royal Navy at an early age and by 1036 was Assistant Chief of the

Naval Air Staff

Curie Marie Skłodowska work on radioactivity, 235 Curie Pierre

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De Gaulle Charles (1890 ) French sol dier and statesman When France sur rendered to Germany in June 1940 he refused to accept his country's submis sion From London he rall ed and led French soldiers sailors and airmen who escaped as well as the underground groups in France the Free French movement In 1945 he became presi dent of the new I rench republic A graduate of Saint Cyr (the French West Point) he served in World War I and afterward strongly advocated a mechanized French army

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Dog abort crimes tribonal bog abort crimes tribonal populate, and the first populate, and the first populate, and the first populate, and the first populate closing years of the war. He got widely known in April 1947, when he led a bold raid by American bombers on Tolyo Following that texploit he criminanded the Twelfth Air Force in a constant of the tribute of the first population.

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Girl Scouts 153 Glasgow, Ellen (1874-1945) American nov elist She was born and lived in Rich mond. Virginia and her stories have a realistic Southern setting She rebelled against the over romantic tradition in Southern writing, and presented her characters more as people who might live anywhere Among her finest novels are Barren Ground The Romantic Comedians and Vein of Iron In This Our Life won a Pulitzer Prize and was

made into a motion picture Glass, for house construction, 264 Gloucester, Duke of, 61 62

Goering, Hermann (1893 ), German army officer who was head of the German air forces and second in command to Hit ler A German air hero of World War I, he was an early follower of Hitler though he belonged to the old Prussian military aristocracy Late in 1945 he was brought to trial for war crimes be fore the international tribunal in Nu

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Hagg Gunder 287 88 Half life, term used in radioactivity 237 39 Halsey, William Frederick (1882) ) \mer ican naval officer who commanded the United States fleet in the southwest Pacific, under Admiral Nimitz He was in personal command of all the fleet

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terious mission, and was interned in England for the rest of the war At the end of 1945 he was being tried before the international tribunal in Nurem berg

Heyea tree, 245, 247, 253 Hibernation, of attimals, 303 Hirohito (1901- ), emperor of Japan For centuries whoever held this position was considered god by the Japanese people as the long line of rulers were supposed to be descendants of the Sun Goddess

Hirohito (continued)

This religious aspect of the throne was carefully cultivated by the governing class to keep the Japanese people in subjection Late in 1945, however, Hirohito announced that his people were no longer to consider him a sacred

personage

Hiroshima, Japan, 25 History makers of World War II, 154 58 Hitler Adolf (1889- ), dictator of Ger many From 1933 on he was absolute ruler of Germany, and his inordinate ambitions were chiefly responsible for bringing on World War II He served in World War I, and organized the Nazi party in the early 1020's On May 1,

1945, just before the German collapse he was reported dead, but the report has not been proved See also 119

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can political leader, born in Sacramento, California He served as Republican senator from that state from 1976 until his teath. We upposed the League of Nations and favored isolationism and was co-author of the Swing Johnson Act which made possible Boulder Dam

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sce, William (Lord Haw Haw) (1907-1946) During the first months of Jovce, William (continued)
World War II, he broadcast from Ger

many to Great Britain trying to convince his audience that German aims were reasonable and that it was stupid to oppose them. Captured soon after V.E. Day, he was tried in England for treason, and paid the penalty with his

life on January 5 1946 Judge, court officer, 188 Juditer, planet, 18

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Kern, Jerome (1885 1945), American composer He wrote lilting tuneful scores for a long list of musical plays that have become part of theatrical history among them Sally, Roberta and Show boat His most famous song Ol Man

River, was in Showboat

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King Ernest Joseph (1878). J commander

m chief of the United States Fleet from
December, 1941, to December 1945.

Fleet Admiral king was senior member
of the Army and Navy Joint Board of
Strategy and a member of the Com
binned Chiefs of Staff of the United
States and Great Britain. A submarine
expert and an avaitor he was previously, chief of the Navy Board of selecrecord to the Navy Board of selecrecord to the Navy Board of selecrecord to the Navy Gold Star in lieu of a third Distinruished Service Medal for his 'fore

ruished Service Medal for his 'fore

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Lang Cosmo Gordon Lord (1864 1945) English churchman He was Archbishop of York from 1909 to 1928 and Arch bishop of Canterbury and Primate of All England from 1028 to 1042 He was outspoken in the cause of justice and worked to bring about a greater unity among the various Christian churches

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Lloyd George David Earl of Dwyfor (1863 1945) British statesman born in Manchester England though his father came from Wales He was prime minis ter of Britain during and after World War I and was one of the Big Four who drafted the Versailles Treat; He was often called the man who won the last war Born into poverty he suf fered grave hardships in his youth For fifty four years he sat in the House of Commons as Liberal member for Caernaryon Wales His earldom came in January 1945 only two months be fore his death

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MacArthur, Douglas (1880 ), command ing general of the United States forces occupying Japan and under Albed au thority in charge of the reconstruction of the Japanese government industry and so on Under him Japan is being disarmed and various political reforms have been instituted. In command in the Philippines in December, 1941 he was ordered to leave by President Roosevelt in March, 1942 Thereafter he halted the Japanese attempt to m vade Australia and became supreme commander of all the Allied forces in the southwest Pacific He served in the first World War, and spent many years in the Philippines He has the five star rank of General of the Army See

also 28 McCam John Sidnes (1884 1945) Ameri can naval officer who was in command of the famous Carrier Task Force of the Third Fleet He helped to prepare the way for the Peleliu action gave air cover for the invasion of Leyte and helped to win the second Battle of the Philippine Sea An Annapolis graduate he served in World War I and in December, 1941, was in charge of the Vaval Air Station at San Diego

Macintosh Charles 253

McCormack John (1884 1945) Irish tenor Born in County Athlone Ireland of poor parents he won world wide fame in opera and as a singer of ballads He first came to the United States in 1909 and became a citizen in 1919 But the last years of his life were spent near Dublin

Mc ab Archibald (1864 1945) Canadian political leader Born in Glengarry On tarso he went to the West to farm at the age of 18 settling first in Manitoba and then in Saskatchewan He served the latter province as lieutenant gov ernor for 9 years

McNaughton Andrew G (1887 ) Ca nadian army officer Until lite in 1943 when illness forced him to retire be was in command of the Canadian Army overseas, with headquarters in London He served through World War I and later became director of military train ing and deputy chief of the Canadian General Staff Magnesium 51

Universal Postal Union oa Malaya rubber 245 247 251 253 Manchuria 30 Manshot tree 247 Manufactures see Industry Marshall George Catlett (1880 ) Ameri can army officer From September 1939 until Vovember 1945 he was chief of staff and the highest ranking general of the United States Army On his retirement President Truman appointed Marshall his special envoy to China with the rank of ambassador During the war he was responsible for the development of military plans and for carrying out strategic plans in conjunction with the Naval Staff and Al I ed Staffs

Mascagni Pietro (1864 1945) Italian com poser His best known work is the opera Cavalleria Rusticana which brought him fame overnight in 1800. He wrote a number of other but less successful operas and was very popular in Italy

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Montgomery Sir Bernard (1887 ) com manding general of the British forces

T 401 7

Montgomery Sir Bernard (continued) occupying Germany He led the famous British Eighth Army which in 1943 drove the German forces under Rom

mel from El Alamein in Egypt to Tunis and bore the brunt of the Funisian and Sicilian campaigns

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Mountbatten Louis Lord (1000- ) Brit ish admiral and supreme Allied com mander in southeast Asia from August 1943 in charge of land sea and air forces In December 1945 he held a conference in Singapore on the prob lems of the Netherlands Indes and French Indo China where the natives are demanding greater rights if not out right independence. He entered the Royal Navy in 1913 and made a bril liant record in World War II In 1942 he was chief of Combined Operations (the Commandos)

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Nimitz, Chester William (1885 ) chief of Naval Operations the highest rank ing admiral in the Navy He was pro moted to this rank in December 1945 For the four previous years he was com mander in chief of the United States Pacific Fleet, with headquarters in Ha

wan, and thus had direction of all naval action against the Japanese Nobel Prizes, 229 science awards in 20th century 273

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Panama in 1945 Panama was represented at the San Francisco Conference in March, in May, women voted for the first time in Panama's history, Lurique 1 Jimenez became provisional president of Panama, June 15, Florencio H Arosemena former president of Pan ama died August 30, the United States Navy completed the great fuel pipe line

across the Isthmus of Panama on September 6

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Patch Alexander M , Jr (1889 1945), com manding general of the U S Army forces that won Guadalcanal He led the Seventh Army to victory in Europe Son of a general he was born at Fort Huachuca Arizona and graduated from West Fort During World War I he

san service in France Patton George Smith, Jr (1885 1945), American general in command of the Third Army, which spearheaded the great drive across western Europe in the last year of World War II He had won victories previously in North 4f rica and Sicily He was an audacious forceful leader with a swashbuckling colorful personality Death came as the

result of an automobile accident, and he was buried in the Third Army ceme-Pearles, George R (1888 ) ), Canadian army officer who was in command of Canada's Pacific Coast Defense He acted in conjunction with the United

States forces in the recapture of the Aleutian Islands from the Japanese late in 1943 In France with the Canadian Expeditionary Force in World War I he won the Victoria Cross For a time he was a member of the Canadian Northwest Mounted Police

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Pétain Henri Philippe (1856 ) head of the Vichy Government which collaborated with the Germans in the occupation of France On August 15 1045 a Paris jury found him guilty of intelli gence with the enemy and returned a verdict of death General de Gaulle commuted the death sentence to life imprisonment Petain achieved fame in World War I particularly in the siege of Verdun and had a long career in the French Army See also 123 24

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gan zation 66 Prussia 142 44 Puddling furnace in iron manufacture 172

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American war correspondent He be came a beloved foure for his simple homely accounts of the men in the fox holes of World War II where he lived with them. He was born near Dina Indiana and was a newspaper man all his life. He was killed by a Japanese fullet on Ie Shima a timy island off Okinawa



Ouestions before the world 230-31

Outck freezing of food 20 Ouisling Vidkun (1887 1945) leader of the nazi sympathizers in Norway who col laborated with the German occupation forces. His name has entered the lan guage as a synonym for tra for A Net wegian he yet helped to prepare the way for the German invasion of he country In October 1945 he was exe euted by a fring squad in Oslo for high

treason Our natural history 100

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in Canada 83 new home uses 165 Radio waves 333 Radwactivity 234-44 266-69 Radiograf h 24

Rad um 215 239-41 Raeder, Lrich (18 0- ) German naval officer who was in command of the German Navy and later War Fleet 11 mital Inspector When the Nat 1 came to power he pured them and worked had to retuil German raval power for which II ther rewarded it in with the high command at the end of 1945 to

Raeder Erich (continued) was on trial before the international tribunal in Nuremberg Rafferty Jim 288

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Ramsay Betiram Home Sir (1883) 1043)
Bittish admiral who served as naval
deputy of General Estenburger It was
the Bottish Army at Dunkirk and four
years later he directed naval operations
in the Allhed invasion of Vormandy
He was kinghted for his services at
Dunkirk. His brill and career in the
Sunkirk. His brill and career in the
as the result of a fatal plane crash

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Raddell William Renwick (1852 1945)
Canad an jurist From 1920 until his
death be was senor justice of the Court
of Appeal Ontain During the early
part of his Career he was a professor of
mathematics but he was called to the

bar by the Lawyers Society of Upper Canada wth gold medal in 1883 Rochdale principles of co-operative move

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Roosevel Franklin Delan's (1883 1043)
32nd president of the United States
1933 43 These were dramatic years in
the world's history covering the depression and World War II and Roosevelt became one of the world's leading
statesmen He was born at Hyde's lark
New York and educated at Groton and
Harvard and first entered politics in

Rosevelt Frankim Delano (continued) rolo In spite of the crippling results of an attack of infantile paralysis in 1921 he later was elected governor of New York twice and president of his country four times. See also 330 and The Book of Knowledge Annual 1945

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Salten Felix (1870 1945) Austrain writer creator of Bambi the lovely story for children which was later made into a Disney motion picture. He was forced to flee when Hiller invaded Austria and spent his last years in Switzetland Other works for children are Petri. The Hound of Florence and Herr Wenzel.

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Shaposhnikov, Boris Mikhailovich (1882 1945). Russian marshal He was chief of the Supreme Soviet Vilitary Acad emy, and served as chief of the general staff during the first year of the German invasion of Russia. Ill health forced him

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Smith Adam, 107-08 Snyder, John Wesley (1896- ), director of the Office of War Mobilization and Reconversion This is one of the most important positions in the Truman Ad ministration as the office has the tremendous job of turning industrial ef forts into peacetime channels. He is not a newcomer to government, but has served with the Defense I lant Corpora tion and the Reconstruction l'inance Corporation His home is in St Louis Social agencies

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Spaatz Carl (1801 American army officer who was in command of the United States Atmy Air Forces in the Mediterranean area under Air Marshal Tedder In 1014 Spaatz was appointed commander in chief of the United States bombing forces against Germany In December, 1045 he was presented with the 1945 Robert J Collier avia tion trophy annual award of the \a tional Aeronautic Association for dem onstrating the air power concept in the war in Europe

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Stark Harold Raynsford (1880 can admiral who commanded the United States payal forces in Europe His most important duty was to main tain close co-operation between the British and American naval depart ments Previously he had held the im portant post of Chief of Naval Opera tions He has had a long career in the Navy and during World War I was a member of Admiral Sims's staff Ad miral Stark retired in July, 1945

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United States representative with rank of ambassador, to Security Council and principal representative to the United ations Organization General Assem bly, which was to meet in London in January, 1946 I rom November, 1944 to June 1945 he served as Secretary of State, and in the spring of 1945 was temporary head of the San Francisco Conference He entered government service in 1940, from the post of chair man of the board of the United States Steel Corpx ration

Stilnell Joseph W (1883- ), American army officer From 1942 until the end of 1944 he was commanding general of the United States forces in China Burma and India and a member of the staff of Chiang Kni shek. He had served in China previously and learned the Chinese language. In 1945 he was made

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chief of the Army Ground Forces and
in November was named president of

in November was named president of an Army board to study equ pment needed by the post war Ground Forces

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Szold Henrietta (1860 1945) American Jewish women's leader founder of Hadassah the wo'nen's Zionist organization in the United States She served as editor of a number of Jewish publications and was an outstanding leidler in the work for Palestine where she lived during her last years

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Timoshenko Semyon (1895), command ing general with the rank of marshal of the general defense of Stalingrad and

the campaigns that crushed the German Army and recaptured Rostov He is one

Timoshenko Semyon (continued)

of the leading Russian strategists As a youth he was active in the Russian Revolution Earlier in World War II he directed the strategy in the Polish and Finnish campaigns and in 1941 held the Germans at Smolensk until preparations for the defense of Moscow were

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d sappearing eggs 385 86

Truman Harry S (1884 ) president of the United States In 1944 he was elected vice-president and became president in April 1943, societies, Prankin Rousevelt Truman served 38 years of the State State Stat

War I and came out with the rank of major From 1924 to 1934 he was presiding judge of Jackson County VI s sour Court administration 322 29 Trustersh p Council of United Nations Or

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Van de Graaff generator, 269 Vandegrift, Alexander Archer (1887 commander, with the rank of heutenant general, of the United States Marine Corps, which post he has held since 1943 He led the Marines who attacked and held Guadalcanal against powerful enemy forces in 1942 At Bougainville, in 1943, he commanded the First Marine Amphibious Corps He was born in Virginia, joined the Marines at an early age, and has seen service in Haiti, Nicaragua, Mexico, Cuba and China

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Army and chief of artillery With Mar shal Zhukov he supervised the offensive to relieve Stalingrad and had a prom ment part in the offensive which freed Rostov in the fall of 1942. The Russian Army is powerfully equipped with ar tillery, which is one of their most im portant arms

Voroshilov, Klementi (1881- ), first mar shal of the Union of Soviet Socialist Republics, who commanded the Lenin grad sector, which underwent a long stege He is a member of the Council of Commissars and for a time was chair man of the Defense Committee One of the original supporters of Lenin and Stalin, he has held a number of im portant political and military posts

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Wainwright, Jonathan Mayhew (1883-American army officer who commanded the American forces at Bataan and Cor regidor in the Philippines, and was forced to surrender after all munitions and supplies had been exhausted For three years, until the defeat of Japan he was held prisoner, suffering severe hardships On his return to the United States he was made a full general and given the Congressional Medal of Honor for 'intrepid and determined leadership ' He is the son and grandson of army officers, and had a notable career in World War I and in the

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Werfel Franz (1890 1045) writer born in Prague now the capital of Czechoslovakia He was most famous as the au thor of the novels The Song of Berna

dette (made into a motion picture) and The Forty Days of Musa Dagh Flee ing the Nazis he came to the United States in 1940 and died in Hollywood West Indes Schooler Pool 85 86 Western Air L nes 68 Westphalia Treaty of (1648) 141

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Yamashita Tomovuki commander of the Japanese armies that captured the Malay Leninsula and Singapore and then conquered the I hilippines He was a violent pro German and acquired a notorious reputat on for brutality. In 1045 he was brought to trial for condoning atrocities by his troops in the I hilippines and sentenced to be hanged His appeal to the Supreme Court to void the Manila trial and transfer case from the War Department to a United States court was still pend ing at the year's close but there was little likelihood that he would escape execution

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forces that outflanked the Germans at Stal ngrad and captured or destroyed twenty two German divisions A prize prisoner was the German commander Marshal von Paulus Veremenko has a cold and bitter hatred of the Aaris who killed his wife and young son early in the war

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Zhukov ('eorgy (1894 ) commanding general with the rank of marshal of the Russian forces occupying Germany He participated in the formal surrender of Germany and signed for Russia During the war he was in command of the Moscow area and served as first vice-commissar for defense and as sec ond in command under Stalin He en tered the Russ an Army as a private and rose rapidly. He first became widely known for his defeat of the Japanese in the undeclared war in Mongol a in 1938 39

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